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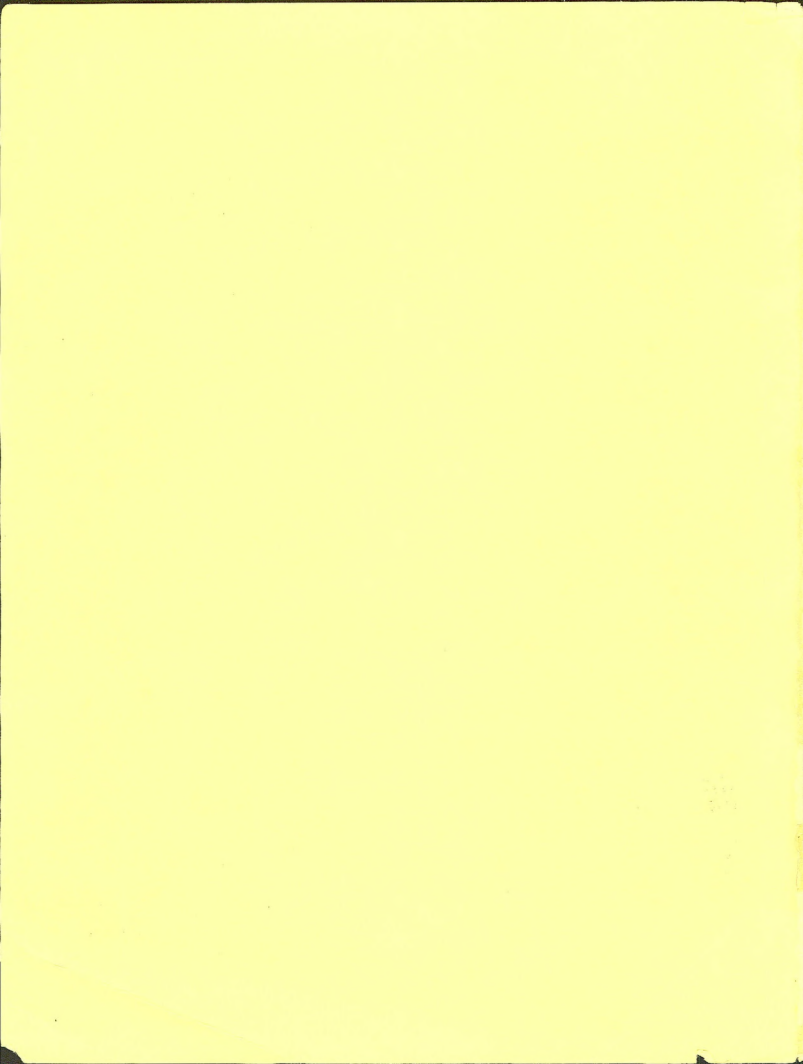
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GRASS CREEK

GRAZ- ING DRAFT ENVIRONMENTAL IMPACT STATEMENT

U. S. DEPARTMENT OF INTERIOR
BUREAU OF LAND MANAGEMENT
WORLAND DISTRICT, WYOMING
1982

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NOTICE

The Bureau of Land Management proposes to continue to allow livestock grazing on 966,000 acres of public land in the Grass Creek Resource Area, Worland District, Wyoming. The proposal is to manage grazing allotments at different levels of intensity to maintain present conditions, improve present conditions or prevent deterioration of present conditions. Proposed actions include changing grazing treatments and seasons of use, adjustments in use levels, and providing additional grazing management facilities and land treatments. Four alternatives (No Change, No Livestock Grazing, Optimize Livestock Grazing and Manage for Other Than Grazing Use) are analyzed along with the proposed action. The affected environment is described, and the environmental impacts are documented.

For further information contact: John Moorhouse, Team Leader, Bureau of Land Management, Box 119, Worland, Wyoming 82401, telephone (307) 347-6151.

Comments may be submitted to the above address until June 11, 1982. All comments will be considered. Those which raise questions or issues concerning the effects of the proposed action, present new data, or question facts or analyses will be responded to in the final EIS.

Sincerely yours,

Maxwell T. Lieurance
State Director

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GRASS CREEK GRAZING

ENVIRONMENTAL IMPACT STATEMENT

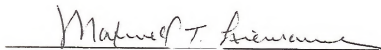
DRAFT

Big Horn, Hot Springs, Park and Washakie Counties State of Wyoming

Prepared by

Department of the Interior Bureau of Land Management

Worldand District

A handwritten signature in dark ink, appearing to read "Mark T. Llewellyn", is written over a horizontal line.

State Director

Wyoming State Office



SUMMARY

The Grass Creek Grazing Environmental Impact Statement (EIS) analyzes the effects of proposed and alternative livestock grazing management on approximately 965,000 acres of public land administered by the Bureau of Land Management (BLM), Worland District, in Wyoming. This document will be used to determine future grazing management, based on the principles of multiple use and sustained yield. See Glossary for definitions and explanation of technical terminology.

AREAS OF CONTROVERSY

Prior to preparation of the EIS, a "scoping" process was conducted to identify significant issues. Based on contacts with federal, state, and local agencies; organizations; and individuals, the following list of issues was developed:

1. Providing adequate forage for livestock and wildlife;
2. Possible livestock reductions on some allotments;
3. Change in season of use on some allotments (particularly from spring use to other seasons);
4. Effects of livestock grazing on soil, watershed, vegetation, wildlife, recreation, cultural, visual, and wilderness resources;
5. Economic consequences of various management actions;
6. Providing for an equitable balance between livestock grazing and other uses on the public land, while minimizing governmental influences on traditional activities.

PROPOSED ACTION AND ALTERNATIVES

Proposed Action

It is proposed that BLM continue the existing management of livestock grazing at present in the Grass Creek Resource Area (GCRA) while monitoring that use to determine if management objectives are being met. Management objectives are to maintain present range condition on 60 allotments (164,000 acres); improve range condition on 53 allotments (615,000 acres); and prevent deterioration

on 49 allotments (172,000 acres). There is some public land in the GCRA that is not in an allotment or licensed for grazing (14,000 acres).

The proposed action is based on multiple-use recommendations developed during the land use planning process now being completed for Grass Creek. Actions in the proposal include: (1) inventory and monitoring, (2) adjustments in consumptive grazing use, (3) changing seasons of use, and (4) constructing additional grazing management facilities and conducting land treatments on selected areas.

Alternative 1 (No Change)

The current livestock grazing management would be continued. Grazing systems on existing allotments would remain. Present livestock management facilities would be maintained at the present rate but new facilities would not be installed. Grazing permits would be issued at present levels of grazing preference (108,000 AUMs). No specific forage allocation would be made for wildlife or wild horses.

Alternative 2 (No Action - No Livestock Grazing)

All authorized grazing on federal lands would be eliminated as permits expire (approximately 1989) except trailing use. Only those range improvements that benefit other uses would be maintained. No new improvements for livestock grazing would be installed.

Alternative 3 (Optimize Livestock Grazing)

All available forage would be allocated to livestock on a sustained yield basis. All wild horses would be removed. All range improvements and plant treatments that would benefit livestock grazing would be implemented except as constrained by land use plan recommendations other than those intended to protect wild horses and wildlife.

Alternative 4 (Manage for Other Grazing Uses)

Other grazing uses would be given preference over livestock grazing. Wild horse numbers would be limited to land use plan recommended numbers. Conflicts between livestock and other grazing use would be eliminated by restricting or excluding livestock.

LONG-TERM ENVIRONMENTAL CONSEQUENCES

Vegetation

The proposed action would result in improved range condition on approximately 600,000 acres and Alternatives 2, 3 and 4 would improve condition on approximately 965,000 acres. Alternative 1 would cause little change from the present situation. The proposed action and all alternatives except Alternative 1 would result in an increase of forage production.

Soils

Alternatives 1 and 3 would cause little change in the acreage of decreased soil productivity. All other alternatives and the proposed action would result in an improvement over the present situation. Of these the proposed action would result in an acreage of decreased soil productivity between Alternatives 1 and 4. Alternatives 2 and 4 would have the smallest acreage.

Soil erosion would be greatest with Alternative 1. The proposed action and Alternative 3 would result in intermediate levels of soil erosion, and Alternatives 2 and 4 would cause the least soil erosion.

Water

Surface water runoff would change only slightly from the present with Alternative 1. The proposed action and Alternatives 2 and 4 would decrease runoff by about 6-8 percent and Alternative 3 by about 10 percent. Sediment yield would be affected similarly to soil erosion.

Wildlife

The proposed action would increase big game carrying capacity but carrying capacity would not be enough to reach Wyoming Game and Fish Department goals. Alternative 2 would result in wildlife carrying capacity far in excess of G&F goals and Alternative 4 would allow the goals to be reached. Alternative 1 would result in the least forage available for wildlife.

Recreation and Visual Resources

The proposed action and Alternatives 2 and 4 would slightly increase hunting opportunities and visual quality. Alternatives 1 and 3 would result in a slight decrease in hunting opportunities.

Livestock Grazing

The proposed action would improve livestock conditions (weaning weights, calf crops, etc.) in allotments that would be managed with range improvements as an objective. Alternative 1 would cause little change. Alternative 2 would result in an estimated average 20 percent reduction in livestock numbers. Alternative 3 would require increased management control and livestock production would be slightly increased. Alternative 4 would result in reduced livestock numbers in most allotments but livestock condition would be improved.

Economics

The proposed action would result in a long-term reduction of total livestock related annual personal income to the Big Horn Basin of \$200,000. Alternative 1 would cause no change while Alternative 2 would cause a decrease of \$1.2 million, Alternative 3 would increase personal income by \$390,000 and Alternative 4 would decrease personal income by \$100,000. None of the alternatives is expected to cause more than half a percentage change in total employment in the Basin.

CONCLUSIONS

The No Livestock Grazing (2) and Manage for Other Uses alternatives (4) would provide major

benefits to most natural resources; however, they would cause a decrease in total income and disrupt traditional grazing operations on public land.

The No Change alternative (1) would allow deterioration of natural resource values in some allotments. The Optimize Livestock Use alternative (3) would allow for an overall increase in livestock use but would cause reductions in other grazing uses.

The proposed action allows for overall improvement for many natural resources on a majority of

the Grass Creek Resource Area while causing least relative disruption to the livestock industry and historical grazing uses. It also complies with federal regulations and is consistent with local plans and policies. It represents a reasonable balance of resource utilization and has been selected as the "preferred" alternative in the Grass Creek Grazing EIS.

Table S-1 is a comparative summary of projected long-term impacts.

TABLE S1

COMPARATIVE SUMMARY OF PROJECTED LONG-TERM IMPACTS (20 YEARS)

Resource	Existing Situation	Proposed Action	Alternative			
			1 No Change	2 No Livestock Grazing	3 Optimize Livestock Grazing	4 Manage for Other Grazing Uses
<u>Vegetation</u>						
Ecological Condition (1,000 Acres)						
Good/Excellent	333	711	298	836	737	812
Fair	503	229	510	128	215	170
Poor	166	62	194	38	50	20
<u>Forage Production</u> (Million Lbs.)						
	72	92	68	106	103	98
<u>Soils</u>						
Sediment Yield (Ac.Ft. per year)						
	1,750	970	2,350	550	880	640
<u>Water</u>						
Surface Runoff (1,000 Ac.Ft. per year)						
	20.0	18.7	20.1	18.3	17.7	18.4
<u>Wildlife</u>						
% Change from Present in Carrying Capacity for Big Game						
	0	+5	-17	+67	-4	+17
<u>Recreation</u>						
Recreation Opportunities						
	N/A	Slight Increase	No Change	Slight Increase	Slight Decrease	Slight Increase
<u>Livestock Grazing</u>						
Change from Existing Management Situation		Some change on 37% of allotments	No Change	Change on all allotments	Change on all allotments	Change on all allotments

TABLE S1 (cont'd)

COMPARATIVE SUMMARY OF PROJECTED LONG-TERM IMPACTS (20 YEARS)

Resource	Existing Situation	Proposed Action	Alternative			
			1 No Change	2 No Livestock Grazing	3 Optimize Livestock Grazing	4 Manage for Other Grazing Uses
Change in Demand For Livestock Forage	0%	-12%	0%	-30%	0%	-15%
<u>Economics</u>						
Change in Ranch Valuation (Millions of dollars)	N/A	- 3.6	0	- 7.4	-1.4	- 3.1
Total Change in Livestock Related Personal Income in Bighorn Basin (Thousands of dollars)	N/A	-200	0	-1230	+390	-100

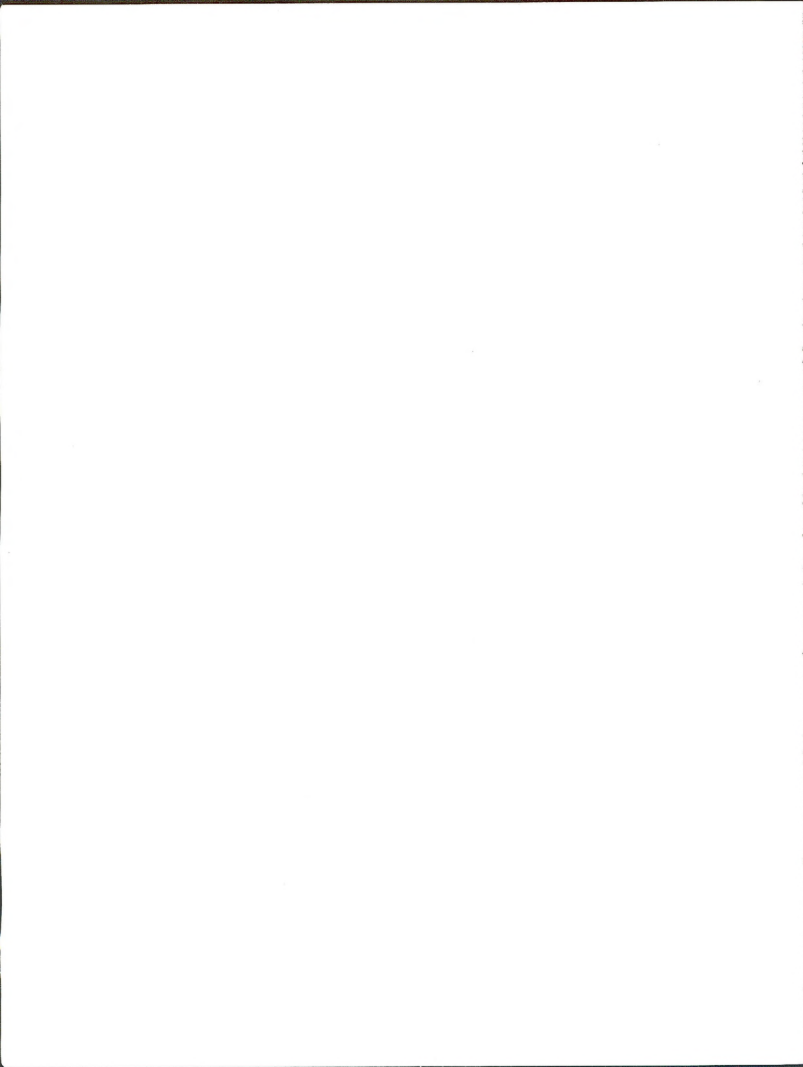


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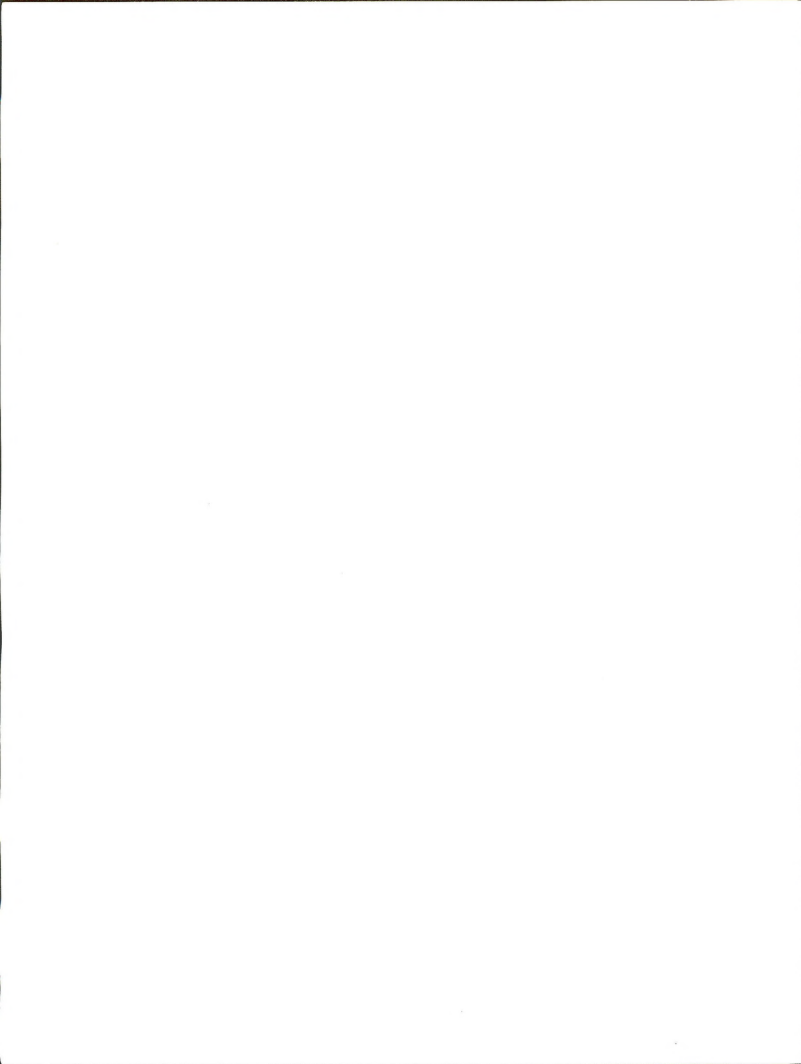
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CHAPTER 1

ALTERNATIVES INCLUDING THE PROPOSED ACTION

INTRODUCTION

The Bureau of Land Management (BLM) is responsible for managing livestock grazing on public lands in a manner that would protect and improve rangeland condition and the productivity of public land resources, such as soils, water, vegetation, and wildlife habitat. The Bureau's authority and direction for managing livestock grazing on public lands comes from the Taylor Grazing Act of 1934, Federal Land Policy and Management Act of 1976 (FLPMA), and the Public Rangelands Improvement Act of 1978.

This environmental impact statement (EIS) addresses a livestock grazing management proposal and several alternatives for the Grass Creek Resource Area located within the Worland District, Wyoming (see Figure 1-1). The area is located in northcentral Wyoming and includes portions of Hot Springs, Washakie, Big Horn, and Park counties. The major town in the area is Worland. There are approximately 1,521,000 acres included within the area. Lands administered by the BLM (referred to as public lands) cover 965,000 acres. State, private, and other federal lands not administered by the BLM occupy the other 556,000 acres.

The proposed action and alternatives are a result of the Bureau's planning process, the CEQ regulations, and the grazing management policy. The proposed action, Alternative 3 (Optimize Livestock Grazing), and Alternative 4 (Manage for Other Grazing Uses) are based on recommendations coming from the Grass Creek Management Framework Plan (MFP) or the Bureau's land use plan. The proposed action is derived by reconciling and/or coordinating competing resource recommendations resulting in a multiple-use proposal while Alternatives 3 and 4 are based on resource activity (e.g., range, wildlife) recommendations optimizing specific activities. These are recommendations and not decisions. Decisions will be made following completion of this EIS and the MFP. The land use plan objectives and decisions for managing the rangeland resources will be published in the Rangeland Program Summary (Figure 1-4). Alternative 1 (No Change in Existing Livestock Grazing), and Alternative 2 (No Livestock Grazing) are included to comply with the requirements of the CEQ regulations (1502.14), to provide a baseline for impact

comparison, and to examine a wide range of livestock grazing management options.

The proposed action is based on the grazing management policy. This policy calls for a categorization of allotments with similar characteristics and needed management actions through the land use planning, EIS process. This categorization process includes consultation with all affected parties. Consultation has taken place throughout the planning process and following issuance of the draft rangeland management policy. A series of meetings were held throughout the Basin to explain the new policy and the categorization process and to obtain input for development of the criteria to be used in categorization. Later, BLM employees attempted to meet with every livestock operator for an on-site discussion of the categorization of their allotments. All but a few operators were contacted. Consultation with all affected and interested parties will continue throughout the development and implementation of rangeland management decisions. Through the categorization process and setting of priorities for management needs, available funds and manpower will be distributed to achieve their most effective use in improving rangeland condition and productivity. Where necessary, livestock and other consumptive uses will be brought in line with estimated grazing capacity through a set of management actions including rangeland improvements, grazing treatments, rangeland monitoring, and schedules for phasing in livestock use adjustments. Normally, such adjustments will be phased in over a period of time sufficient to permit monitoring.

This EIS will provide information for management decisions by analyzing impacts of the proposed action and alternatives and by identifying mitigation measures in accord with the National Environmental Policy Act of 1969, the CEQ regulations, and the U.S. District Court judgment, in Case No. 1983-73, *Natural Resources Defense Council, Inc., et al. vs. Rogers C. B. Morton, et al.* In accord with this judgment, the final EIS for this area must be completed by September 30, 1982. The amended final judgment in this case (dated April, 1978) states:

"Each EIS contemplated by this Order shall discuss in detail 'livestock grazing activities' and all reasonable alternatives thereto. 'Livestock grazing activities' as used in this Order shall mean all existing or proposed livestock grazing, all grazing use authorizations issued or

ALTERNATIVES INCLUDING THE PROPOSED ACTION

contemplated to be issued by the BLM as well as those substantial activities which are supportive of and related to livestock grazing administered by BLM, such as fencing, livestock water development, spraying, chaining, seedling, and brush removal."

Following the completion of this EIS, subsequent environmental assessments would be prepared where impacts of management decisions were not covered in this EIS. Such environmental assessments would be prepared at the allotment management plan level, on types of actions, or on individual actions as the situation requires.

PURPOSE AND NEED

The purpose and need of the proposed action and alternatives as stated in the grazing management policy are to attain the following goals:

1. Authorize livestock grazing of the public rangelands under the principles of multiple use and sustained yield;
2. Protect, maintain, and improve the rangeland resources through sound land use and grazing management decisions;
3. Conduct the level of soil and vegetation inventories necessary to support management decisions and provide a baseline for monitoring programs;
4. Increase and encourage systematic cooperation, consultation, and coordination with rangeland users and owners of intermingled land as part of the land use and grazing management decision making process;
5. Determine appropriate stocking levels (including proper season and area of use) based on the best available information, and authorize livestock grazing consistent with those stocking levels;
6. Initiate cost-effective rangeland improvements that will help improve the condition of the lands for livestock grazing, wildlife habitat, wild horses and burros, and watershed protection, etc.; and
7. Monitor rangeland resources and livestock use to assist in determining proper stocking levels and measure progress toward achieving management objectives.

To attain these goals the Bureau has developed three categories to facilitate management. These categories (which are the basis for the proposed action but not the alternatives) should encompass

nearly all resource situations; however, the development of specialized categories for allotments or areas requiring unique management objectives is not precluded. General management objectives for each category are: (1) maintain current satisfactory condition; (2) improve current unsatisfactory condition; and (3) manage custodially, while protecting existing resource values.

The specific objectives to attain these goals are a part of the recommendations of the Management Framework Plan (the BLM's land use plan) for the Grass Creek Resource Area (GCRA) and are closely tied to categorization. These objectives are:

1. Implement actions that will improve existing resource conditions and productivity to enhance multiple use by the end of FY 1989 on 53 "I" (improvement) category allotments comprising 615,000 acres of public land.
2. Maintain or improve the current balanced use and satisfactory range condition and productivity on "M" (maintenance) category allotments for the next 20 years (60 allotments comprising 164,000 acres public land).
3. Manage rangelands on the 49 "C" (custodial) category allotments comprising 172,000 acres of public land in a custodial manner that will protect the existing resource values for the next 20 years.

These objectives reflect the selective management philosophy, a part of the BLM's Grazing Management Policy which recognizes that successful resource management depends, in large part, upon District personnel having the flexibility to take into account local resource conditions, rangeland uses, and the management capabilities of the District when implementing a Bureauwide policy.

Selective management is based on the concept that: (1) an allotment's resource characteristics, management needs, and potential for improvement can be identified; and (2) the timing and intensity of the management actions should be varied according to an allotment's identified needs and potential. Potential for improvement is the capacity of an allotment to produce a positive return on public investments within a reasonable time period. Positive return can be viewed in terms of increased resource production or resolution of serious resource use conflicts.

The BLM's authority and direction for managing livestock grazing on public lands comes from several laws. As a beginning, the Grazing Service, one of the predecessors of the BLM, was created by the Taylor Grazing Act of 1934 to regulate livestock grazing on the public lands. The purpose of the Taylor Grazing Act was "to stop injury to the public

ALTERNATIVES INCLUDING THE PROPOSED ACTION

grazing lands by preventing over grazing and soil deterioration; to provide for their orderly use, improvement and development; and to stabilize the livestock industry dependent upon the public range; . . ."

In 1976, Congress passed the Federal Land Policy and Management Act (FLPMA). FLPMA established, for the first time in the Nation's history, the broad policy guidance by which the public lands would be managed. Congress specifically directed, through FLPMA, that "the public lands be retained in federal ownership . . . unless it is determined that disposal of a particular parcel will serve the national interest; (2) the national interest will be best realized if the public lands and their resources are periodically and systematically inventoried . . ." and their present and future use determined through a land-use planning process; and (3) that these lands be managed under the principles of multiple use and sustained yield.

In 1978, Congress affirmed, through the Public Rangelands Improvement Act (PRIA), that "the Secretary of the Interior . . . shall update, develop (where necessary), and maintain on a continuing basis thereafter, an inventory of range conditions and records of trends of range conditions on the public rangelands, and shall categorize or identify such lands on the basis of the range conditions and trends thereof" as the Secretary deems appropriate. The PRIA also prescribed that the development of an allotment management plan should include, "careful and considered consultation, cooperation, and coordination with lessees, permittees, and landowners involved, . . . and any State or States having lands within the area to be covered by such allotment management plan."

Several other laws directly affect the BLM's grazing management program, including, among others, the Wild Free-Roaming Horse and Burro Act of 1971, the Endangered Species Act of 1973, and the National Environmental Policy Act (NEPA) of 1969. Section 102 of NEPA requires that federal agencies prepare detailed environmental impact statements (EISs) for all major federal actions significantly affecting the quality of the human environment. To meet this requirement, the BLM, nationwide, is scheduled to complete 144 site-specific statements by 1988. Most of the grazing EISs completed to date support the congressional finding in PRIA that the public rangelands are producing below their potential for meeting the needs of the basic resources and the users of those resources. The Bureau's responsibility is to increase the production of the rangelands by efficiently managing the basic resources and authorizing uses of the lands consistent with sound resource management principles.

This environmental impact statement addresses the significant impacts of implementing grazing management actions in the Grass Creek Resource Area in the Bighorn Basin of Wyoming (see Figure 1-1).

PROPOSED ACTION

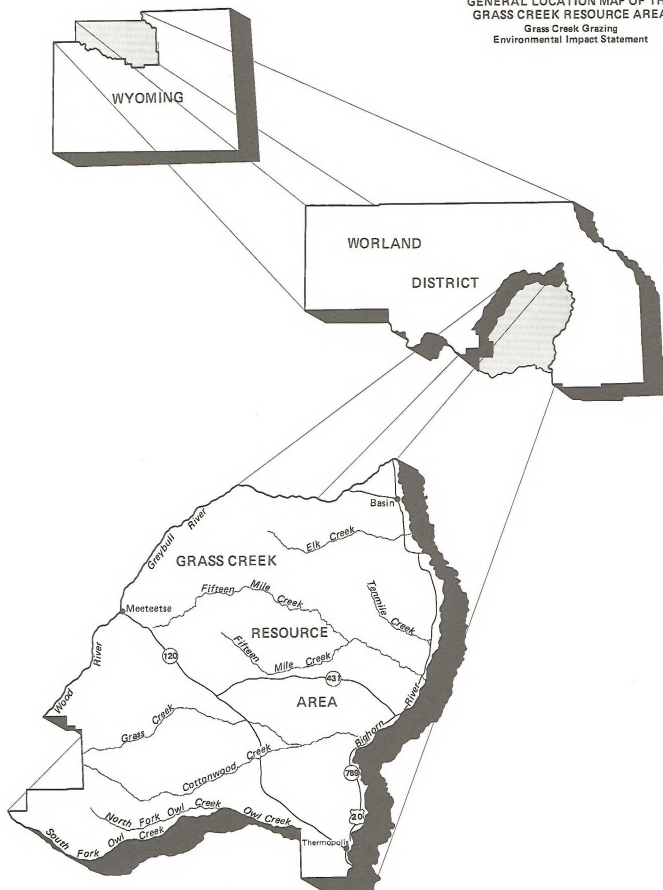
The Bureau of Land Management proposes to develop and implement a livestock grazing management program on public rangelands in the Grass Creek Resource Area based on selective management categories.

Allotment Categorization

Allotments within the Grass Creek Resource Area fit into one of three resource management categories according to renewable resource, economic, and management criteria. The intensity of grazing management proposed would be based on the level of management needed to meet the following management objectives:

1. Maintenance ("M") Category — to maintain or improve the existing resource condition and productivity where range condition and management is considered satisfactory. Allotments in this category are producing at or near their potential and there are no, or only very limited, land use resource conflicts with livestock grazing. Opportunities for BLM management may be limited by land ownership patterns, small acreages, or a small percentage of public lands.
2. Improvement ("I") Category — To improve existing resource conditions and productivity to enhance multiple use where range condition is fair to poor and trend is either static or downward. Allotments in this category have the potential for medium to high vegetative productivity, but are not producing at their potential. Present grazing management practices are inadequate to meet long-term resource objectives, and livestock grazing conflicts with the management of other resources. Thus, multiple use recommendations were devised to resolve these conflicts (Table 1-1). These recommendations were excerpted from the Grass Creek Management Framework Plan. The entire document is available for review in the Worland District Office. Public investments on range improvements in these allotments could yield a positive economic return (Figure 1-3).

Figure 1-1
**GENERAL LOCATION MAP OF THE
 GRASS CREEK RESOURCE AREA**
 Grass Creek Grazing
 Environmental Impact Statement



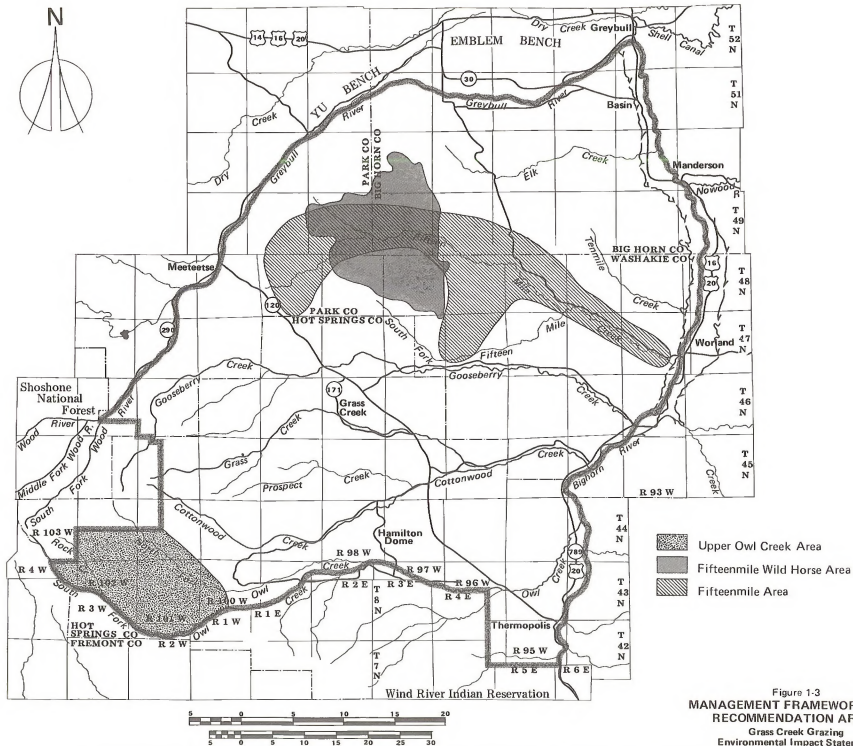


Figure 1-3
**MANAGEMENT FRAMEWORK PLAN
 RECOMMENDATION AREAS**
 Grass Creek Grazing
 Environmental Impact Statement

TABLE 1-1

MANAGEMENT FRAMEWORK PLAN RECOMMENDATIONS

RM 1.1

1. Permit livestock use (numbers, kind, and season of use) as currently authorized on "M" category allotments (Figure 1-2).
2. Flexibility in livestock numbers and turnout and removal dates may be authorized so long as the flexibility is agreed upon through consultation with the operator, is explicitly written out and made a condition of the grazing permit or lease and does not allow grazing use in excess of the grazing preference.
3. Set up condition and trend studies in the 45 "M" category allotments with larger areas of public lands by the end of FY 1984.
4. Where monitoring studies identify significant conflicts or problems are occurring in an "M" category allotment and there is reasonable opportunity to change or improve management. The allotment will then be placed under "I" category management.

RM 1.2

Authorize increases in grazing use where monitoring studies show that the range is in good condition and that additional forage is permanently available. Such increases must be consistent with other multiple use objectives and with maintaining the range in good condition.

RM 1.3

1. Allotment Management Plans (AMPs) may be developed on "M" category allotments. The BLM will cooperate with permittee or other agencies taking the lead in developing management plans for "M" category allotments.
2. Where an "M" category allotment is an integral part of an operation that also has "I" category allotments, the "M" category allotment can be included in the AMP for the "I" category allotment(s) (Figure 1-2). BLM will take the lead for these AMP's.
3. AMP's for "M" category allotments will be developed under the same constraints as set out for "I" category allotments where applicable (refer to MU Recommendation RM 3.2).

TABLE 1-1

MANAGEMENT FRAMEWORK PLAN RECOMMENDATIONS
(Cont'd)

RM 2.1

1. Permit livestock use (numbers and kind) as currently authorized on "C" category allotments.
2. No livestock will be permitted during the period May 1 to August 31 except as outlined in RM 2.2-1.
3. Flexibility in livestock numbers, turnout and removal dates may be authorized so long as the limit of flexibility is agreed upon through consultation with the operator; is explicitly written out and made a condition of the grazing permit; and does not allow grazing use over the grazing preference.
4. Condition and trend studies will be set up by the end of FY 1983 on "C" category allotments where the season of use will be changed and by the end of FY 1984 on other "C" category allotments.
5. Where monitoring studies show range conditions in an allotment are continuing to decline or identify other significant resource conflicts are occurring as a result of livestock grazing, livestock grazing will be excluded in that allotment.

RM 2.2

1. As an alternative to RM 2.1 the livestock permittees could develop a grazing system whereby livestock grazing could be continued during the period May 1 to August 31. Such grazing systems will conform to the following restraints:
 - a. No livestock grazing could occur prior to range readiness.
 - b. No grazing could occur prior to seed ripe on key plant species two years out of three.
 - c. No grazing would occur prior to seed ripe on key species until the grazing system is developed and until all needed livestock management facilities are installed.
 - d. The permittee is responsible for funding and implementing the necessary management facilities.
 - e. The grazing system must have BLM approval.
2. Actual use, utilization, and climate studies in addition to condition and trend studies would be intensified to evaluate the effectiveness of the grazing system toward achieving "C" category objectives.
3. Where the grazing system fails to meet the management objectives the system will be modified, season of use will be changed or grazing excluded on that allotment. In any case "C" category allotment AMP's should be developed under the same constraints as set out for "I" category AMP's where applicable.

TABLE 1-1

MANAGEMENT FRAMEWORK PLAN RECOMMENDATIONS

(Cont'd)

RM 2.3

1. Authorize the construction of livestock management facilities, primarily fences and water developments, to facilitate livestock management and grazing distribution on "C" category allotments. The facilities must be consistent with protecting the existing resource values in "C" category allotments.
2. Range improvements will be located, designed and constructed or implemented under the same constraints as set out for "I" category range improvements where applicable (refer to recommendation RM 3.3).

RM 2.4

1. Allotment Management Plans (AMPs) may be developed on "C" category allotments. The BLM will cooperate with permittees or other agencies taking the lead in developing management plans for "C" category allotments.
2. Where a "C" category allotment is an integral part of an operation that, also, has "I" category allotments, the "C" category allotments will be included in the AMP for the "I" category allotments. BLM will take the lead in these AMPs.
3. AMPs for "C" category allotments will be developed under the same constraints as set out for "I" category allotments where applicable (refer to MU Recommendation RM 3.2).

RM 3.1

1. Determine the appropriate stocking levels for "I" category allotments.
2. Make specific forage allocations to livestock, wildlife and wild horses when the estimated grazing capacity is established.
3. The grazing capacity will be determined through inventory and monitoring with consultation with the affected parties.
4. Adjust livestock use levels to the estimated grazing capacity on all "I" category allotments by FY 1988.
5. Short-term adjustments will be determined by either:
 - a. Consultation and written agreement with the operator.
 - b. Actual use, utilization and climate studies and inventory data - these studies will be set up on all "I" category allotments during FY 1982 - normally 2 to 3 years data will be sufficient to make initial adjustments.

TABLE 1-1

MANAGEMENT FRAMEWORK PLAN RECOMMENDATIONS
(Cont'd)

- c. Corresponding wildlife habitat and watershed studies will be set up when needed.
6. Long-term adjustments will be determined by actual use, utilization, climate and condition and trend studies. Condition and trend studies will be initiated FY 1982 on a priority basis. Corresponding wildlife habitat and watershed studies will be conducted with range studies where needed.
7. Adjustments will be implemented as follows:
 - a. Prior to establishment of the estimated grazing capacity livestock use will be permitted as currently authorized; wildlife use will be considered that established by the Wyoming Game and Fish Department Strategic Plan and wild horse use will be established at 100 wild horses long-term average for the Fifteenmile wild horse management area (Figure 1-3).
 - b. Upon establishment of the estimated grazing capacity for an allotment the forage will be allocated between livestock and wildlife. In the Fifteenmile wild horse area, forage will first be allocated for the wild horses and the balance will be allocated between livestock and wildlife.
 - c. Adjustments will be initiated for each allotment as soon as the forage allocation has been determined for each respective allotment.
8. No livestock forage will be allocated in the fragile alpine areas above 10,000 feet elevation.
9. When a decrease in available forage results from excluding (fencing) an area from livestock grazing the level of grazing use will be adjusted accordingly. In areas where rehabilitation, reseeding, or other such improvements are occurring, the adjustment may be restored when the rehabilitation is completed.

RM 3.2

1. Develop and implement Allotment Management Plans (AMPs) for all "I" category allotments in accordance with 43 CFR 4120.2 by the end of FY 1988.
2. Update existing AMPs in accordance with 43 CFR 4120.2-3 by the end of FY 1986.
3. The development, implementation and updating of AMPs will be closely coordinated with watershed and wildlife activities to resolve conflicts and identify appropriate constraints to be placed on livestock grazing. Special attention will be focused on wetlands and riparian areas.

TABLE 1-1
MANAGEMENT FRAMEWORK PLAN RECOMMENDATIONS
(Cont'd)

4. Constraints that will be addressed in AMP development include:
 - a. Upper Owl Creek Area (Figure 1-3)
 1. Grazing systems will provide complete rest on riparian zones at least one year in three.
 2. Defer grazing until peak of flowering on key riparian species two years in three.
 3. If the grazing system does not improve the channel habitat or riparian (zones), vegetation through the zones will be fenced to exclude livestock grazing.
 4. Forage utilization will be limited to 50 percent of the current year's growth to ensure adequate vegetative cover remains for watershed protection.
 - b. Fifteenmile Area (Figure 1-3)
 1. Grazing systems will provide for maintenance of plant vigor, allow for seed production, provide litter for ground cover. Special emphasis will be placed on riparian zones.
 2. Limit forage utilization to 50 percent of the current years vegetative production to assure adequate cover remains to protect the watershed.
 3. Where the larger riparian areas do not improve under a grazing system they will be excluded from livestock grazing by fencing.
 - c. Where wetland wildlife habitat objectives cannot be met with grazing system implementation, the more important wetland areas will be fenced to protect and enhance the habitat values.
 - d. Where new seedlings, plantings or land treatment practices are planned provisions for deferment or resting following the treatment will be included.
 - e. Salting and mineral supplements will be located outside the wetlands and riparian areas and a minimum of 400 yards from water.
 - f. Livestock grazing will be deferred on specifically identified elk calving areas until July 1.

TABLE 1-1
MANAGEMENT FRAMEWORK PLAN RECOMMENDATIONS
(Cont'd)

- g. Develop grazing systems that provide for:
 - 1. Deferred areas on primary elk spring range and primary antelope and deer fawning areas.
 - 2. Deferred or rest pastures in elk breeding areas for the breeding period.
 - 3. Rest pastures in elk winter areas.
 - 4. Provide at least one rest pasture in allotments located in important big game areas.
- h. Give consideration where practical to:
 - 1. Deferring livestock grazing in identified blue grouse nesting and brood areas.
 - 2. Allowing only winter grazing in identified partridge habitat where bluebunch wheatgrass is predominant.
 - 3. Changing class of livestock from sheep to cattle in allotments where there is crucial winter antelope habitat.
- i. Provide that all gates be left open when not required for livestock confinement.
- j. Do not allow livestock waters to be developed in crucial elk, deer and antelope winter areas.
- 5. Where an "I" category permittee also has allotments in the "M" or "C" category that are an integral part of their overall livestock operation the AMP should be expanded to include these other allotments.
- 6. Wherever possible allotment management plans and habitat management plans should be developed simultaneously in the more important wildlife areas.

RM 3.3

- 1. Range improvements will be installed where needed to facilitate livestock management and improve range condition and productivity on "I" category allotments. The type, location, ownership and general specifications of the range improvements will be determined in the AMP development.

Estimates of the extent of range improvement needs for the "I" category are:

- a. Fences - 100 to 140 miles
- b. New Reservoirs - 50 to 70 units
- c. Water Catchments - 20 to 30 units

TABLE 1-1

MANAGEMENT FRAMEWORK PLAN RECOMMENDATIONS
(Cont'd)

- d. Water Wells - 5 to 15 units
- e. Water Pipelines - 45 to 55 miles
- f. Spring Developments - 55 to 65 units
- g. Land Treatment Practices
 - 1. Ripping blue grama stands - 40,000 to 43,000 acres
 - 2. Prescribed burning (sagebrush and juniper) - 8,000 to 9,000 acres
 - 3. Sagebrush chemical control - 20,000 to 28,000 acres
- 2. The design and location of range improvements will be closely coordinated with the watershed, wildlife and recreational activities to resolve conflicts, identify constraints modifications or additions that will optimize the benefits to be derived from the improvement.
- 3. A benefit/cost analysis will be performed on the improvements required to implement each allotment management plan on an allotment basis to assure improvements are implemented in the most cost effective manner.
- 4. Livestock water development and design will, where feasible:
 - a. Address development of islands in stockwater reservoirs for waterfowl.
 - b. Address fencing reservoirs and piping water to troughs for livestock to enhance riparian vegetation.
 - c. Consider designing reservoirs for fisheries where sites have potential.
 - d. Provide that water be available for wildlife during the livestock grazing period and when livestock are not in the area.
 - e. Provide for tank overflow areas on spring developments be fenced.
 - f. Provide that drip pipes be located along pipelines to establish succulent vegetation areas - these areas should be fenced.
 - g. Provide that water troughs be partially buried, equipped with bird ladders and partially covered to cut evaporation loss.
 - h. Consider designs that will provide open water in wildlife and wild horse areas during winter periods.
- 5. Fence development and design will, where feasible:
 - a. Require that interior pasture fences be limited to standard three wire barbed wire fences not to exceed 38" high.
 - b. Require that allotment boundary fences be limited to standard four wire barbed wire fences not to exceed 38" high.
 - c. Require that wetlands or riparian enclosure fences be limited to standard four wire barbed wire fences not to exceed 38" high.
 - d. Exceptions may be allowed where sheep are in adjacent areas - then 26" net wire with one barbed wire above could be allowed with total height not to exceed 38"; but in no case will new net wire fences be allowed on antelope and deer travel routes and critical habitat areas.
 - e. Require poles on fences located in timber in elk areas not to exceed 38" high.
 - f. Avoid fences on steep slopes where big game travel.

TABLE 1-1

MANAGEMENT FRAMEWORK PLAN RECOMMENDATIONS
(Cont'd)

6. Land treatment implementation and design will:
 - a. Require complete rest the first year following treatment and deferment through seed ripe on key species the second year following treatment as a minimum.
 - b. Require that vegetation manipulation treatment (sagebrush removal) in important wildlife habitat areas conform to wildlife Addendum No. 2 (attached).
 - c. The use of pesticides and herbicides will be closely supervised to ensure compliance with regulations and to ensure protection of wildlife species.
7. Range improvements in the Upper Owl Creek area will not significantly impair the natural character and scenic quality of the area and will strictly comply with the Visual Resource Management Class II for that area.
8. Range improvements in all areas will conform to the respective Visual Resource Management Class for each respective area.
9. All range improvements proposed in wilderness study areas will comply with the interim wilderness management guidelines.
10. All proposed range improvements will receive archeological/cultural clearance prior to construction or implementation.
11. When range improvements are proposed in areas known or suspected to be inhabited by threatened and endangered species the BLM will conduct consultation with the U.S. Fish and Wildlife Service under Section 7 of the Endangered Species Act of 1973.

TABLE 1-1
MANAGEMENT FRAMEWORK PLAN RECOMMENDATIONS
(Cont'd)

ADDENDUM No. 2

GRASS CREEK MFP STEP 1 - WILDLIFE VEGETATION TREATMENT
CRITERIA AND IMPLEMENTATION CONSIDERATION

Sagebrush land treatment practices will be applied in important wildlife habitat areas only to the extent that they are consistent with maintaining or enhancing wildlife habitat values. Treatments, area size, location, and mosaic patterns and treatment application sequence will be designed to maintain or improve a balance of habitat diversity for food and cover on a continuing basis. Land treatment practices will not be applied in important wildlife habitat areas where such treatment will diminish the wildlife habitat values.

Sagebrush removal by burning is normally the most desirable method of treatment for wildlife habitat improvement. Mechanical control such as rotary beating can be used effectively in many situations. Chemical spraying is normally undesirable and should be used sparingly in important wildlife habitat areas.

1. Analyze the wildlife habitat area (block analysis concept, minimum of 5,000 acres) to determine amount and location of treatment that can be allowed and yet maintain habitat integrity.
2. Conduct joint field inspections with the Wyoming Game and Fish Department personnel on proposed sagebrush treatment areas for their review and input.
3. On sage grouse ranges:
 - a. Control sagebrush only when canopy cover exceeds 25 percent. USFS guidelines use 20 percent cover for Artemisia tridentata (wyomingensis and vaseyana) and 33 percent for Artemisia tridentata (tridentata). Sage grouse use declines where canopy cover exceeds 30 percent.
 - b. Exclude treatment from nesting and brood areas.
 - c. Exclude treatment from crucial wintering areas.
 - d. Exclude treatment from isolated stands of 10 acres or less that are located more than one mile from other sagebrush stands.
 - e. It is desirable to retain 35 to 50 percent canopy cover or to create intermittent wet meadow areas along waterways. Treatment along live streams will be limited to burning or mechanical means.

TABLE 1-1

MANAGEMENT FRAMEWORK PLAN RECOMMENDATIONS
(Cont'd)

4. On big game winter ranges:
 - a. Where treatment is applied along sage-timber interfaces it will form an irregular mosaic pattern maintaining a minimum of 100 feet of sagebrush along timber edges and extending to a maximum of 1,200 feet. The alternate patterns extend equidistant along the sage-timber borders.
5. New treatment areas should be located at least 300 feet from natural openings in sagebrush stands.
6. Where understory density of desirable plant species is less than 10 percent seeding will be necessary to assure treatment success.

ALTERNATIVES INCLUDING THE PROPOSED ACTION

3. Custodial ("C") Category — To manage lands in a custodial manner that will prevent deterioration of current resource condition where range condition is variable and allotments have the potential for low vegetative productivity and are producing at or near their potential. The economic returns to public investments for range improvements on these allotments would be negative.

The characteristics, criteria, management objectives, management actions and funding sources for each selective management category in the Grass Creek Resource Area are presented in Table 1-2. Figure 1-2 shows grazing allotments and management categories.

Following a series of public meetings for input to develop the criteria the allotments were placed in categories according to the criteria listed in Table 1-2. Individual livestock operators were contacted following preliminary categorization to discuss "on-the-ground" the reasons why a given allotment was found to fit a given category. Allotments are listed by category in Table 1-3.

Management Actions

Proposed management would be to:

1. Monitor actual use, trend, utilization and climate to estimate grazing capacity;
2. Consult with all affected parties to convey the data collected during monitoring and to arrive at a grazing management prescription including livestock use adjustments, grazing treatments, utilization levels, and season-of-use; range improvements and plant treatments to support grazing management; and
3. Conduct grazing use supervision on all rangelands and take appropriate action on unauthorized use.

These management actions would be accomplished in accordance with the recommendations listed in Table 1-1 and on the schedule shown in Figure 1-4.

Rangeland Inventory and Monitoring

The monitoring program would consist of four basic study elements:

Actual Use — Keeping record of numbers, class, and season of grazing use by livestock, wildlife and wild horses.

Utilization — Collecting and recording data relating to the amount or percentage of annual

production of forage consumed by livestock, wildlife and wild horses.

Climate — Collecting and recording precipitation, temperature and other climatic data that directly affect annual forage production.

Trend — Establishing permanent vegetation studies (and photo records) that can be reread periodically to determine changes that are occurring over time as a result of prescribed management actions.

Supplemental studies would include gathering information on plant phenology, range readiness, forage production, etc., as may be needed for special management considerations.

Short-term effectiveness of management actions will be measured through actual use, utilization and climatic data. Long-term effectiveness will be measured through trend data in addition to the other three elements.

Consultation with affected parties would be emphasized throughout monitoring. Monitoring would be of variable intensity with higher levels occurring in "I" category allotments than in "M" and "C". Livestock operators would be asked to assist BLM in selecting key areas in allotments and in gathering data. The operators would be expected to supply actual livestock use data.

Grazing Treatments

The grazing formula for a given allotment would be based on the phenological development and physiological requirements of key plant species but would also consider livestock management needs. A key species is relatively or potentially abundant and serves as an indicator of changes occurring in the vegetation complex. More than one key species may be selected, however, one species may be important for watershed, one for wildlife forage, another for livestock forage, etc.

Selection and design of a grazing system would be done through consultation with affected parties and based on the following considerations:

- a. Sequence and timing of grazing and rest periods (grazing formula) to achieve management objectives.
- b. Improvement and development practices needed to initiate the system.
- c. Livestock handling requirements and economic considerations of the operator.
- d. Present ecological condition of the allotment.

Almost every grazing allotment, because of vegetation diversity, climate, soils and topography and

TABLE 1-2
SELECTIVE MANAGEMENT CATEGORIES FOR
GRAZING ALLOTMENTS IN THE GRASS CREEK RESOURCE AREA

'M'
MAINTENANCE

CHARACTERISTICS	<p>A-- Present range condition is satisfactory</p> <p>B-- Present management is satisfactory</p> <p>C-- Allotment is producing at or near its potential</p> <p>D-- There are no, or very limited, land-use resource conflicts with livestock grazing</p> <p>E-- Land ownership pattern may or may not be considered</p> <p>F-- There may be positive economic return of public investments</p>
CATEGORY CRITERIA	<p>A-- Present range condition good to excellent</p> <p>-- Range condition can be maintained under present management or</p> <p>B-- Present range condition is at least fair and improving</p> <p>-- Improvement can continue under current management or</p> <p>C-- Present range condition is fair or better</p> <p>-- Range conditions can be maintained with present management</p> <p>-- Opportunities for BLM management are limited due to land ownership pattern, small acreage and/or low percent public lands</p>
MANAGEMENT OBJECTIVE	<p>-- Principal objective is to authorize actions that will maintain or improve the existing resource condition and productivity</p>
MANAGEMENT ACTIONS	<p>A-- Livestock use (numbers, class, season of use) will be permitted as presently authorized. Increases in use may be allowed when consistent with multiple use objectives</p> <p>B-- Prescribed flexibility in turnout and removal dates and livestock numbers through consultation</p> <p>C-- Range improvements will be authorized if they meet management objectives</p> <p>D-- Will conduct low intensity use supervision and monitoring</p> <p>E-- Monitoring will focus on livestock use changes and changes in ownership</p>
FUNDING SOURCE	<p>A-- Private investment in range improvements</p> <p>B-- Range betterment funds (\$100)</p>

TABLE 1-2

SELECTIVE MANAGEMENT CATEGORIES FOR
GRAZING ALLOTMENTS IN THE GRASS CREEK RESOURCE AREA
(Cont'd)

'I'
IMPROVEMENT

CHARACTERISTICS	<p>A-- Present range condition is fair to poor, range condition and trend is static or apparently downward</p> <p>B-- Present grazing management practices are inadequate to meet long-term resource objectives</p> <p>C-- Allotment has potential for medium to high vegetative productivity, but is not producing at or near its potential</p> <p>D-- Resource conflicts with livestock grazing are evident</p> <p>E-- Potential for positive economic return on public investments</p>
CATEGORY CRITERIA	<p>-- Allotments that do not meet the 'M' or 'C' category criteria fall into the 'I' category. Each of these allotments have a combination of some or all of the category 'I' characteristics</p>
MANAGEMENT OBJECTIVE	<p>-- Principal objective is to implement actions that will improve existing resource conditions and productivity to enhance multiple use</p>
MANAGEMENT ACTIONS	<p>A-- Livestock use may be increased or decreased as needed to meet management objectives</p> <p>B-- Prescribed grazing management and range improvements developed through consultation</p> <p>C-- Range improvements will be authorized and installed as needed to meet management objectives</p> <p>D-- Will conduct variable intensity use supervision and monitoring</p> <p>E-- Monitoring will evaluate the effectiveness of actions taken toward achieving management objectives</p>
FUNDING SOURCE	<p>A-- Private investment in range improvements</p> <p>B-- Range betterment funds (8100)</p> <p>C-- Appropriated funds under the Federal Land Policy and Management Act and Public Rangeland Improvement Act</p>

TABLE 1-2

SELECTIVE MANAGEMENT CATEGORIES FOR
GRAZING ALLOTMENTS IN THE GRASS CREEK RESOURCE AREA
(Cont'd)

'C'
CUSTODIAL (C₁)

CHARACTERISTICS	<p>A-- Present range condition is variable</p> <p>B-- Allotment has potential for low vegetative productivity and is producing at or near its potential</p> <p>C-- There is no present likelihood of positive economic return on public investment</p>
CATEGORY CRITERIA	<p>A-- Production potential is low, due to low annual precipitation, badlands, or poor soils</p> <p>B-- Range condition trend appears to be static or declining</p> <p>C-- Grazing occurs during critical growth period for key plant species</p> <p>D-- Land treatment opportunities nonexistent due to low rainfall, badlands, or poor soils</p> <p>E-- Resource conflicts with livestock grazing may be evident</p>
MANAGEMENT OBJECTIVE	<p>-- Principal objective is to manage lands in a custodial manner that will prevent deterioration of current resource conditions, with prescribed flexibility of livestock operations</p>
MANAGEMENT ACTIONS	<p>A-- Increases in livestock use will not be permitted without improved range condition</p> <p>B-- Change season of grazing to the noncritical plant growth period and continue to authorize current use level or At operator's initiative, a mutually acceptable grazing use plan is reached through consultation or Livestock grazing excluded</p> <p>C-- Prescribed flexibility of turnout and removal dates and livestock numbers through consultation</p> <p>D-- Range improvements will be authorized if they meet management objectives</p> <p>E-- Will conduct low intensity use supervision and monitoring</p> <p>F-- Monitoring will focus on livestock use changes and changes in ownership</p>
FUNDING SOURCE	<p>A-- Private investment in range improvements</p> <p>B-- Range betterment funds (8100)</p>

TABLE 1-2
SELECTIVE MANAGEMENT CATEGORIES FOR
GRAZING ALLOTMENTS IN THE GRASS CREEK RESOURCE AREA
(Cont'd)

'C'
CUSTODIAL (C₂)

CHARACTERISTICS	<p>A-- Present range condition is variable</p> <p>B-- Allotment has potential for low vegetative productivity and is producing at or near its potential</p> <p>C-- There is no present likelihood of positive economic return on public investment</p>
CATEGORY CRITERIA	<p>A-- Production potential is low, due to low annual precipitation</p> <p>B-- Range condition appears to be static or improving</p> <p>C-- Grazing is occurring outside critical growth period for key plant species</p> <p>D-- Land treatment opportunities are nonexistent (low rainfall)</p> <p>E-- No resource conflicts with livestock grazing evident</p>
MANAGEMENT OBJECTIVE	<p>-- Principal objective is to manage lands in a custodial manner that will prevent deterioration of current resource conditions, with prescribed flexibility of livestock operations</p>
MANAGEMENT ACTIONS	<p>A-- Livestock use will be permitted as currently authorized</p> <p>B-- Prescribed flexibility of turnout and removal dates and livestock numbers through consultation</p> <p>C-- Range improvements will be authorized if they meet management objectives</p> <p>D-- Will conduct low intensity use supervision and monitoring</p> <p>E-- Monitoring will focus on livestock use changes and changes in ownership</p>
FUNDING SOURCE	<p>A-- Private investment in range improvements</p> <p>B-- Range betterment funds (8100)</p>

TABLE 1-3

ALLOTMENTS BY MANAGEMENT CATEGORY

Allotments in "M" Category

0515	Upper Gooseberry	0616	Home
0519	Middle Creek	0617	Gloyd Ind.
0520	Red Creek	0630	Iron Creek
0523	Highway	0638	Rush Ind.
0530	Grass Creek Basin	0643	Buchanan
0532	Whiskey Gulch	0644	Tanner
0534	East Cottonwood	0645	Coal Draw
0535	West Cottonwood	0646	Back of Rim
0536	Heifer	0647	Steer
0540	Bridges	0650	South Gebo Common
0551	Coulee - Mill Iron	0657	West Allotment
0552	Milk Creek	0661	Three Peaks Anchor
0553	Richmond	0663	Cow Pasture
0564	Little Buffalo Basin	0665	Nelson
0569	Curtis	0670	Upper Fifteenmile
0572	Individual	0672	Mountain
0574	Coal Draw	0679	Horse Pasture
0582	Mill Iron East	0680	Lake Creek
0584	Jones Flat	2501	Arapahoe Ranch
0586	South Hart	2511	Gould Ind.
0587	Tyber Pasture	2522	Kruger Sec. 15
0593	Hamilton Rim	2538	Jones Ind.
0594	Buffalo Basin	2540	Hot Springs Sec. 15
0595	Iron Creek	2551	Webster Sec. 15
0599	Gooseberry	2555	Lawler Sec. 15
0600	Elk Creek	2562	Meeteetse East
0601	Mormon Creek	2563	Larsen Sec. 15
0604	L.U. Winter	3035	Hunt Oil Ind.
0613	Putney Flat		

TABLE 1-3
ALLOTMENTS BY MANAGEMENT CATEGORY
(Cont'd)

Allotments in "I" Category

0503	Cottonwood Common	0609	Owl Creek
0507	South Gooseberry	0614	Rattlesnake
0508	North Gooseberry	0615	Lime Ridge
0509	New Burlington	0620	Prospect
0510	Fernandez-Blujay	0622	South Highway
0516	Cottonwood	0626	Timber Creek
0522	Grass Creek	0627	Gooseberry
0524	Cottonwood	0628	Hole-in-the Ground
0525	Rock Creek	0633	Upper Pastures
0526	Sand Springs	0634	Lower Pastures
0529	Prospect Common	0635	Vass-Cottonwood Joint
0531	Spring Gulch	0637	Grass Creek
0537	Padlock	0639	Tatman Mtn. Common
0538	Coal Draw	0640	Snyder
0541	Three Peaks	0642	Red Canyon
0542	Rock Creek	0652	Fifteenmile
0545	Grass Point	0662	Fifteenmile
0556	Twenty-One Creek	0669	Allen Basin
0558	Basin	0671	Tenmile
0573	Wagonhound	0678	South Grass Creek
0575	Owl Creek	0681	Spring Creek
0579	Buffalo Creek	1070	South Sleeper
0596	Wagonhound	2510	Gould Ind.
0605	L.U. Spring		
0606	L.U. Summer		
0607	Lake Creek		

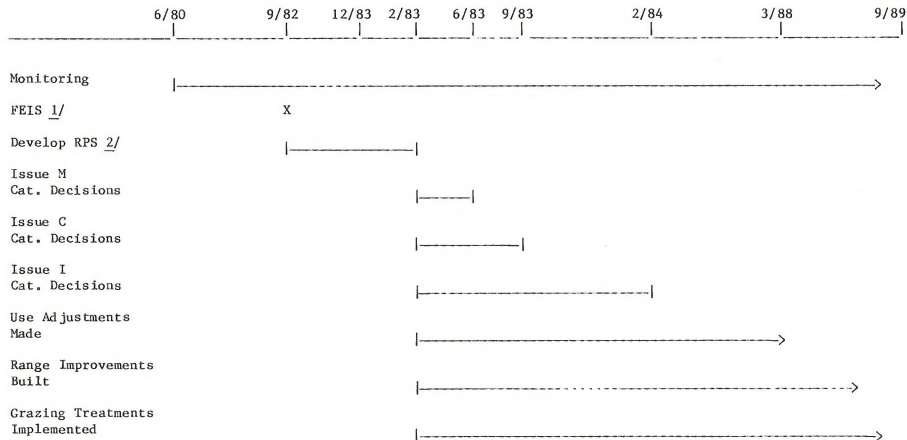
TABLE 1-3
ALLOTMENTS BY MANAGEMENT CATEGORY
(Cont'd)

Allotments in "C" Category

C ₁	C ₂
0063 Groseclose Ind.	0513 Dockery Hammond
0504 Hamilton Dome	0528 Sixmile
0506 Harvey Common	0544 Maller, Ind.
0512 Coulter Group	0549 Greybull Bend
0521 Cottonwood	0557 Ramul Ind.
0527 Blackstone	0583 Owl Creek
0533 Home Ranch	0611 Neves Ind.
0539 Individual	0618 McCarty Ind.
0543 Cannady	0629 Rankine
0546 Highway	0631 East Tatman
0548 D.L. and M Ind.	0668 Dorsey Creek
0554 Waugh Dome	1065 YU Bench
0559 Fivemile	1077 Getzfried Ind.
0561 Freudenthal Ind.	
0566 Owl Creek	
0567 Harvey Ind.	
0576 Elk Creek	
0577 South Basin	
0578 North Basin	
0580 Coal Draw	
0588 Sandstone	
0597 Owl Creek	
0608 Vass Ind.	
0610 South Owl Creek	
0612 North Tatman	
0619 Elk Creek	
0623 North Highway	
0636 Haynes	
0641 Swing Ind.	
0648 Shumway Ind.	
0651 Fivemile	
0653 Red Lane	
0654 Ayers Ind.	
0664 Alamo Creek	
0674 North Tatman	

Figure 1-4

PROPOSED MONITORING, DECISION, AND RANGE MANAGEMENT SCHEDULE



1/ Final Environmental Impact Statement Issued
 2/ Range Program Summary (will be updated periodically)

ALTERNATIVES INCLUDING THE PROPOSED ACTION

associated multiple uses, requires different management. Therefore, the design of a grazing system would vary for each allotment (Table 1-4).

The following grazing treatments (singly or in various combinations) would be combined with scheduled grazing to form grazing systems that would be used in the Grass Creek Resource Area:

Treatment 1: Defer Until Range Readiness — Defer livestock grazing from early spring to mid spring (approximately to development of the fourth leaf on key perennial cool season grasses). This treatment would allow the soil to become firm and plants to begin restoring root reserves prior to spring turnout.

Treatment 2: Graze for Animal Production — This treatment is intended to benefit livestock production rather than the range resource. It may be of short duration or season long depending on the number of pastures involved.

Treatment 3: Defer to Improve Plant Vigor — Defer livestock grazing from early spring to late spring. This treatment would allow key species to reach the flowering stage and regain vigor prior to grazing.

Treatment 4: Defer for Seed Production — Defer livestock grazing from early spring through mid-summer. This treatment would allow key species to produce seed prior to grazing.

Treatment 5: Graze for Seed Planting — Livestock grazing would follow seed ripe on key species. Trampling of seeds into the ground by grazing livestock during seed shatter is a way to improve seeding.

Treatment 6: Rest for Seedling Establishment — Rest for seedling establishment at least one year following seed trampling. In deteriorated range situations, the rest should continue to flowering of key species the second season following seed trample to allow new seedlings to develop secondary roots prior to grazing. Riparian areas may require longer rest periods to allow shrubs and trees to re-establish.

Specific dates for each treatment would be determined on the basis of plant phenology for key species.

Implementation of Grazing Systems — "M" Category Allotments — Existing management practices are achieving "M" category management objectives. Livestock numbers, class and seasons of grazing use would continue to be permitted as currently authorized.

Flexibility in livestock numbers and turnout and removal dates would be allowed. The extent of flexibility would be developed through consultation

with the permittee or lessee and based on multiple use objectives. The deviation from the normal operation would be explicitly defined and would not allow grazing use over limits of active grazing preference. The prescribed flexibility would be documented and made part of the terms and conditions of the permit or lease.

"I" Category Allotments — Detailed livestock grazing plans or Allotment Management Plans (AMPs) would be developed for "I" category allotments following the EIS through consultation with permittees and lessees. Key vegetation factors which would be constraining in AMPs, as well as in other grazing decisions, are listed in Table 1-5. A grazing system designed to improve resource conditions and productivity would be developed and become an integral part of the AMP. The grazing system would be initiated upon implementation of the AMP.

AMP development would be done on a conflict based priority with allotments having the more serious conflicts with other uses being treated first. This prioritization would not preclude specific projects from being completed in allotments of lower priority if the need arose. BLM would consult with affected parties in establishing criteria to set priorities.

"C" Category Allotments — The major problem in the C₁ allotments is that present grazing use begins or occurs during the critical growth period for key plant species.

There would be no specific grazing systems prescribed for the C₁ allotments, however, grazing would be deferred each year until key species reach seed ripe to prevent deterioration of current resource conditions.

An alternative to season changes in the C₁ allotments would be to allow the operator to prepare a grazing system that would meet the "C" category management objectives. This grazing system would require BLM approval. The system would assure that no grazing occurs prior to range readiness every year and that no grazing occurs prior to seed ripe on key species two years out of three. Grazing would not be allowed prior to seed ripe on key species until the grazing system is developed and all necessary facilities installed. Livestock numbers and class would continue to be permitted as currently authorized.

The existing management practices in "C₂" allotments are achieving "C" category management objectives. There would be no prescribed changes from current grazing practices. Livestock numbers, class and seasons would continue to be permitted as currently authorized.

TABLE 1-4

PREScribed RANGE MANAGEMENT FOR THE PROPOSED ACTION
I CATEGORY ALLOTMENTS

Allotment Number	Adjustment in Use		Grazing 1/			Range Improvements						Plant Treatments			
	Change in Forage Consumption	Change in Season of Use	Combinations			Fencing	Springs	Water Catchments	Reservoirs	Wells	Pipelines	Blue Grama Ripping	Sage Spraying	Prescribed Burn	Rotary Brush Cutting
			1	2	3										
0503	X			X	X										
0507	X			X		X		X	X	X	X	X			
0508	X			X		X	X		X		X	X			
0509	X			X		X			X	X		X			
0510	X								X	X	X	X	X		
0516	X			X										X	
0522	X				X					X	X	X			X
0524	X			X			X	X	X					X	
0525	X			X				X	X					X	
0526	X			X				X	X		X		X		
0529	X			X		X	X	X	X	X	X		X	X	
0531	X							X	X	X			X		
0537	X			X		X									
0538	X			X											
0541	X			X			X								X
0542	X			X			X								
0545	X			X		X		X	X				X		
0556	X			X			X	X	X						
0558	X			X			X							X	
0560	X			X											
0568	X			X		X		X			X			X	
0573	X			X						X	X	X	X		
0575	X			X											
0579	X			X		X	X		X	X			X		
0590	X				X	X									
0596	X			X					X	X		X			
0605	X			X			X	X		X			X	X	
0606	X			X			X	X		X	X		X	X	
0607	X			X		X	X		X				X		
0609	X			X			X							X	
0614	X			X		X							X		
0615	X			X			X							X	

TABLE 1-4 (Cont'd)
 PRESCRIBED RANGE MANAGEMENT FOR THE PROPOSED ACTION
 I CATEGORY ALLOTMENTS

Allotment Number	Adjustment in Use		Grazing ^{1/}			Range Improvements						Plant Treatments			
	Change in Forage Consumption	Change in Season of Use	Combinations			Fencing	Springs	Water Catchments	Reservoirs	Wells	Pipelines	Blue Grama Ripping	Sage Spraying	Prescribed Burn	Rotary Brush Cutting
			1	2	3										
0620	X						X	X	X				X		
0621	X		X										X		
0622	X		X							X	X	X			X
0626			X						X			X			
0627	X		X			X			X				X		
0628	X		X			X	X		X				X		
0633	X		X			X	X		X						
0634	X		X			X	X								
0635	X													X	
0637	X		X			X	X	X			X		X		
0639	X	X				X			X		X	X	X		
0640	X		X												
0642	X		X				X	X					X	X	
0652	X			X									X		
0662	X			X					X				X		
0669	X			X			X		X			X	X		
0671	X			X					X		X				
0678	X		X			X	X	X					X		
0681	X		X				X	X					X	X	
1070	X			X					X						
1071	X		X			X					X	X			
2508	X								X		X	X	X		
2510	X		X					X			X		X		
2526	X		X				X	X		X			X	X	
2537	X		X												
2539	X		X				X						X	X	

- ^{1/} Combination 1 - Grazing treatments that include periods of no grazing for one or more years on different pastures.
 Combination 2 - Grazing treatments that include delaying the grazing period until a specified time on different pastures.
 Combination 3 - Grazing treatments that include delaying the grazing period until a specified time on a given pasture every year.

TABLE 1-5
KEY VEGETATION FACTORS

Key Species ^{1/}	Critical Growth Period ^{2/}	Range Readiness ^{2/}	Percent Average Utilization Levels Without Management ^{3/}	Percent Average Utilization With Grazing Management ^{4/}
5-9 inch Precipitation Zone (Average Elevation 4,000 to 5,800 feet)				
Agropyron smithii (Western wheatgrass)	Apr. 12-July 20	June 15	35	50
Agropyron spicatum (Bluebunch wheatgrass)	Apr. 10-July 20	June 12	30	50
Elymus cinereus (Basin wildrye)	Apr. 16-July 24	June 12	30	50
Oryzopsis hymenoides (Indian ricegrass)	Apr. 15-July 10	June 1	30	50
Stipa comata (Needleandthread)	Apr. 15-July 15	June 1	25	50
Scirpus spp. (Bulrush)	May 7-July 20	NA	30	50
Typha angustifolia (Cattails)	Apr. 20-Aug. 1	NA	30	50
Salix spp. (Willow)	NA	NA	15	NA
Artemisia cana (Silver Sagebrush)	NA	NA	25	NA
Artemisia tridentata tridentata (Basin Big Sagebrush)	NA	NA	25	NA
Artemisia tridentata wyomingensis (Wyoming Big Sagebrush)	NA	NA	25	NA
Chrysothamnus nauseosus (Rubber Rabbitbrush)	NA	NA	25	NA
Rhus trilobata (Skunkbush)	NA	NA	20	NA
Populus angustifolia (Narrow Leaf Cottonwood)	NA	NA	15	NA

TABLE 1-5
KEY VEGETATION FACTORS
(Cont'd)

Key Species ^{1/}	Critical Growth Period ^{2/}	Range Readiness ^{2/}	Percent Average Utilization Levels Without Management ^{3/}	Percent Average Utilization With Grazing Management ^{4/}
10-14 inch Precipitation Zone (Average Elevation 4,000 to 7,500 feet)				
Agropyron smithii (Western wheatgrass)	Apr. 25-Aug. 1	June 25	35	50
Agropyron spicatum (Bluebunch wheatgrass)	Apr. 20-July 20	June 15	30	50
Elymus cinereus (Basin wildrye)	Apr. 6-July 28	June 16	30	50
Oryzopsis hymenoides (Indian ricegrass)	May 15-July 15	June 15	30	50
Stipa comata (Needleandthread)	May 15-July 10	June 12	25	50
Stipa viridula (Green needlegrass)	May 20-July 20	June 15	25	50
Festuca idahoensis (Idaho fescue)	May 1-July 10	June 20	25	50
Agrostis stolonifera (alba) (Red top)	May 5-July 20	June 30	30	50
Scirpus spp. (Bulrush)	May 5-July 28	NA	30	50
Carex nebrascensis (Nebraska sedge)	Apr. 25-July 25	NA	30	50
Carex stenophylla (eleocharis) (Needleleaf sedge)	Apr. 18-June 10	NA	30	50
Salix spp. (Willow)	NA	NA	15	NA
Artemisia frigida (Fringed Sagebrush)	NA	NA	20	NA
Artemisia tridentata tridentata (Basin Big Sagebrush)	NA	NA	25	NA
Artemisia tridentata wyomingensis (Wyoming Big Sagebrush)	NA	NA	25	NA
Rhus trilobata (Skunkbush)	NA	NA	20	NA
Eurotia ceratoides (Winterfat)	NA	NA	20	NA
Populus angustifolia (Narrow Leaf Cottonwood)	NA	NA	15	NA
Artemisia nova (Black Sagebrush)	NA	NA	25	NA

TABLE 1-5
KEY VEGETATION FACTORS
(Cont'd)

Key Species ^{1/}	Critical Growth Period ^{2/}	Range Readiness ^{2/}	Percent Average Utilization Levels Without Management ^{3/}	Percent Average Utilization With Grazing Management ^{4/}
15 inch Precipitation Zone (Average Elevation 2,000 to 11,300)				
Agropyron smithii (Western wheatgrass)	May 1-Aug. 1	June 25	35	50
Agropyron spicatum (Bluebunch wheatgrass)	May 5-Aug. 1	June 25	30	50
Stipa viridula (Green needlegrass)	May 5-Aug. 1	June 25	30	50
Leucopoa (Hesperochloa) kingii (Spike fescue)	May 15-July 28	July 1	25	50
Festuca idahoensis (Idaho fescue)	June 1-Aug. 1	June 25	30	50
Carex stenophylla (Needleleaf sedge)	May 25-Aug. 5	July 1	25	50
Salix spp. (Willow)	May 25-June 28	NA	30	50
Artemisia frigida (Fringed Sagebrush)	NA	NA	15	NA
Artemisia tridentata wyomingensis (Wyoming Big Sagebrush)	NA	NA	20	NA
Elaeagnus commutata (Silverberry)	NA	NA	25	NA
Sambucus racemosa (Elderberry)	NA	NA	20	NA
Populus tremuloides (Quaking Aspen)	NA	NA	15	NA

^{1/} These are the current known key species in the Grass Creek Resource Area by precipitation zone. Others may be identified through studies or vegetation surveys.

^{2/} Based on 1978-81 phenological studies conducted by BLM personnel in Grass Creek. Range Readiness is the average date when species reach fourth leaf stage for grasses.

^{3/} Average utilization levels were taken from Grass Creek Resource allowable use factors table. These are the average allowable levels for continuous season-long use.

^{4/} Under intensive grazing management, these levels may not exceed 50 percent for grasses. These utilization levels would also apply for grazing use outside the critical growth period.

NA - Data Not Available. Studies and monitoring are needed.

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Flexibility in livestock numbers, turnout and removal dates would be developed through consultation with the permittee or lessee and based on multiple-use objectives. The deviation from the normal operation would be explicitly defined and would not allow grazing use over the established grazing preference level, nor allow grazing prior to seed ripe of key species. The prescribed flexibility would be documented and made part of the terms and conditions of the permits or lease.

Range Improvements

Range improvements that would be required to facilitate intensive grazing management and improve livestock forage condition and trend. These improvements consist of fences, wells, springs, reservoirs, pipelines, catchments, troughs, tanks and cattleguards (Table 1-4).

Plant treatments such as sagebrush spraying, prescribed burning, rotary brush cutting and blue grama ripping would be proposed to improve rangeland conditions and productivity. All range improvements would conform with the MFP recommendations (Table 1-1) and BLM standards (Table 1-6).

Range improvements for the "M" and "C" category allotments would be subject to BLM approval before operator installation.

The selection and location of range improvements in the "I" category allotments would be determined through consultation with the affected party. Specific projects or locations are not proposed at this time since consultation has not taken place. The opportunities for projects are listed in Table 1-4. Proposed improvements would be analyzed to assure cost effectiveness prior to approval. Operators would participate in construction and installation of some improvements.

Adjustments of Consumptive Use

The vegetation production inventory conducted in 1977-1978, indicates that forage supply does not equal forage demand for the "I" category allotments. Although these data are preliminary they indicate that there may be a supply deficit. They will be supplemented by monitoring prior to any change in estimated carrying capacity. These adjustments would occur only in "I" category allotments and would occur from 6 months to 6½ years following the final EIS (Figure 1-4). It is not possible to indicate which "I" allotments would experience adjustments, at what time, or in what magnitude because monitoring and consultation data is not yet available. It is assumed that for "M" and "C" category allotments supply equals demand. Supply and

demand figures for each allotment and the method used to determine these figures are shown in Appendix A. These are assumed values that will be used for analysis only. Actual adjustments would be based on a combination of consultation, monitoring and inventory (Table 1-7).

Initial Stocking Levels Following This EIS

"M" and "C" Categories — Livestock grazing would continue to be permitted at the levels currently authorized (preference levels in Appendix B). This assumes that forage would be available to meet Wyoming Game and Fish Strategic Plan goals (Appendix C). No wild horses graze on "C" category allotments and on a portion of only one "M" allotment.

"I" Category — Initial stocking levels which could include adjustments will be established through consultation with affected parties, monitoring studies, or forage inventory and monitoring studies. Where no agreement can be reached through consultation and BLM determines that available inventory and monitoring information is inadequate then initial stocking levels would be established at grazing preference (Appendix B).

The Wyoming Game and Fish Department established long-term management levels through consultation with BLM and developed the 1978 strategic plan, and revisions thereof (Appendix C). The strategic plan is being updated at the present time. Based on the results of initial monitoring studies and forage inventories, wildlife adjustments may be necessary. These initial adjustment levels may depart from strategic plan goals until habitat improvement occurs.

Initial wild horse numbers would be established at the level recommended in the MFP multiple use recommendations (100 head).

Subsequent Adjustments of Livestock Use Levels

"M" and "C" Categories — There would be no change in use levels in the short term. A low intensity monitoring program would be conducted by BLM on all allotments. Where monitoring indicates there may be significant problems, the level of monitoring would be intensified. Use levels would be adjusted if necessary after consultation with the affected parties. Where significant resource conflicts exist due to livestock grazing on "C" category rangelands, livestock grazing could be excluded.

"I" Category — Livestock use and other consumptive use would be adjusted where necessary

TABLE 1-6
SUMMARY OF MAJOR STANDARDS FOR RANGE IMPROVEMENTS

Action	Standard ^{1/}
Fences	<ul style="list-style-type: none"> - Height and wire spacing to allow wildlife movement - Located to preclude exceeding the existing visual class zone (see Chapter 2) - Fence lines would not be bladed or scraped - Gates would be installed adjacent to cattleguards
Water Development	<ul style="list-style-type: none"> - Springs fenced and piped into trough - Troughs designed to prevent bird and small animal drowning - Water made available for wildlife - Some reservoirs fenced or partially fenced to provide wildlife habitat
Plant Treatments	<ul style="list-style-type: none"> - Slope restrictions to prevent erosion - Grazing deferred at least two grazing seasons to allow re-establishment - Chemicals cleared by Dept. of Interior - Setbacks from water and timber required - Burning plans cleared by Wyoming Department of Environmental Quality - Reseeding with native species after plowing - Aerial spraying when wind speed is less than 6 miles/hour - Minimum 100 foot buffer on live streams and other water sources for chemical aerial application
General	<ul style="list-style-type: none"> - Cultural resources clearance required. If sites are discovered, the project would be relocated or redesigned, or a "salvage" program would be done - Threatened or endangered species clearance to avoid any adverse impacts to listed species - In wilderness study area, new range uses will only be allowed if compatible with wilderness values - No new access roads would be constructed - Cooperative agreements with range users would outline maintenance responsibilities

^{1/} More specific standards are listed in Table 1-1 and exact standards (wire spacing, fence height, etc.) are described in the Seven Lakes Grazing EIS, Rawlins, Wyoming.

TABLE 1-7

FORAGE DEMAND FOR THE PROPOSED ACTION
(1,000 Pounds of Forage)

<u>Category</u>	<u>Demand</u>	
"M"	Livestock	38,315
	Wildlife	6,593
	Wild Horses	215
	Total	<u>45,123^{1/}</u>
"I"	Livestock	80,084
	Wildlife	8,289
	Wild Horses	865
	Total	<u>89,238^{2/}</u>
"C ₁ "	Livestock	12,309
	Wildlife	1,571
	Wild Horses	-
	Total	<u>13,880</u>
"C ₂ "	Livestock	935
	Wildlife	226
	Wild Horses	-
	Total	<u>1,161</u>
All	Livestock	131,643
	Wildlife	14,274
	Wild Horses	1,080
	Grand Total	<u>146,997</u>

^{1/} For the proposed action it is assumed that supply is equal to demand in all "M" and "C" category allotments.

^{2/} Supply for this category is 38,815 (1,000 lbs.) based on preliminary forage production data.

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to meet multiple use management objectives after the estimated grazing capacity is established. The estimated grazing capacity would be based on inventory and/or monitoring.

Environmental Assessments

Subsequent environmental assessments would be prepared where impacts of management decisions were not sufficiently covered by the scope of this EIS. Such environmental assessments would be prepared at the allotment management plan level, on types of actions, or on individual actions as the situation requires.

Grazing Decisions

After release of the final EIS the District Manager would publish a draft Rangeland Program Summary (RPS) which summarizes the land use planning objectives for all rangeland and proposed grazing decisions that affect livestock grazing. Then grazing decisions would be issued for each grazing allotment by management category (Figure 1-4). Each grazing decision would document whether grazing use would be permitted as currently authorized or adjusted (increased or decreased). When grazing use adjustments are necessary, those adjustment decisions would normally indicate the initial stocking level and prescribe a schedule for adjusting livestock use to reach the estimated grazing capacity. The decisions would also state: (1) specific management objectives for the allotment, (2) resource values to be evaluated, to determine progress in meeting those objectives, (3) changes in resource values that would warrant a modification of the scheduled adjustments, and (4) other information necessary to determine required actions.

When livestock use adjustments are needed, the BLM would consult with the affected livestock operators in scheduling adjustments.

Grazing Use Supervision

The objective of use supervision is to ensure compliance with the grazing regulations and terms and conditions of permits, leases, and AMPs. Although there is overlap with the "actual use" portion of the monitoring program, the available work force will be concentrated in areas with the most severe resource problems or potential for problems. In the absence of known unauthorized use, allotments in the "improve category" will receive first priority, "custodial category" allotments second pri-

ority, and "maintain category" allotments third priority.

DESCRIPTION OF THE ALTERNATIVES

Four alternatives to the proposed action were analyzed and will be discussed. These include:

1. No Change in Existing Livestock Management
2. No Action (No Livestock Grazing)
3. Optimize Livestock Grazing
4. Manage For Other Grazing Uses

A summary of range management practices and livestock use of the proposal and alternatives appears in Table 1-8.

Alternative 1 — No Change in Existing Livestock Management

This would be a continuation of the existing livestock management conditions (Table 1-8). Grazing permits would be issued at present levels of use, i.e., 108,000 AUMs (Table 1-9). No additional grazing systems or range improvement projects would be implemented but existing facilities would be maintained. Wild horse numbers would be maintained at about 100 head by periodic control actions and limited to the area recommended in the MFP (Figure 1-3). There would be no specific vegetation allocation for wild horses or wildlife. Table 1-9 displays forage demand for Alternative 1.

Alternative 2 — No Action (No Livestock Grazing)

All authorized livestock grazing would be eliminated on federal lands as permits expire except trailing use that would allow livestock movement to or from private, state and national forest lands. Most permits will expire in 1989. Table 10 indicates forage supply and demand for this alternative. Other resources would be managed in accordance with MFP recommendations. Range supervision would be necessary to assure compliance with trailing permits and to monitor for trespass. It is expected that landowners would have to build an undetermined amount of fence on private and state lands to avoid livestock trespass. On public lands only range improvements that benefit other resources

TABLE 1-8

SUMMARY OF PROPOSED RANGE MANAGEMENT PRACTICES BY ALTERNATIVE
(Public Lands)

Range Management	Preferred Alternative Proposed Action			Alternative 1	Alternative 2	Alternative 3	Alternative 4
	Category M	Category I	Category C	No Change in Existing Management ^{1/}	No Action (No Livestock Grazing)	Optimize Livestock Use	Manage for Other Grazing Uses
Grazing Treatments (acres) ^{2/}							
Combination 1		139,900		119,800	0	149,700	149,700
Combination 2		94,300		169,600	0	551,600	111,700
Combination 3		284,700	176,900	190,000	0		439,900
Range Improvements							
Fencing (miles)		120		630	0	150	150
Springs (no.)		60		20	0	80	80
Water Catchments (no.)		30		1	0	30	30
Reservoirs (no.)		60		370	0	80	70
Wells (no.)		10		60	0	20	20
Pipelines (miles)		50		10	0	60	60
Plant Treatments (Acres)							
Blue Gramma Ripping		41,800		0	0	46,000	42,200
Sagebrush Spraying		24,000		14,500	0	37,000	26,600
Prescribed Burning		8,600		0	0	19,600	19,600
Rotary Brush Cutting		1,000		0	0	1,000	1,000

^{1/} Magnitude of existing range management practices^{2/} Combination 1 - Grazing treatments that include periods of no grazing for one or more years on different pastures.

Combination 2 - Grazing treatments that include delaying the grazing period until a specified time on different pastures.

Combination 3 - Grazing treatments that include delaying the grazing period until a specified time on a given pasture every year.

TABLE 1-9
FORAGE SUPPLY AND DEMAND FOR ALTERNATIVE 1
(1,000 Pounds of Forage)

	<u>Demand</u>	<u>Supply</u> ^{1/}
Livestock	131,643	
Wildlife	14,274	
Wild Horses	<u>1,080</u>	
Total	146,997	72,441

^{1/} Based on preliminary forage production data.

TABLE 1-10
FORAGE SUPPLY AND DEMAND FOR ALTERNATIVE 2
(1,000 Pounds of Forage)

	<u>Demand</u>	<u>Supply</u> ^{1/}
Livestock	0	
Wildlife	16,679	
Wild Horses	<u>1,080</u>	
Total	17,759	72,441

^{1/} Based on preliminary forage production data.

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would be maintained. Others would be left in place but neither maintained nor repaired. No new range improvements would be constructed for livestock grazing purposes. Wild horses would be maintained at a level of 100 head by periodic control and limited to the area recommended in the MFP (Figure 1-3).

Alternative 3 — Optimize Livestock Grazing

Livestock grazing would be given preference over other grazing uses. Prescribed practices for "I" category allotments are shown on Table 1-4. Those for "M" and "C" category allotments are shown on Table 1-11. Generally, this alternative would:

- Allocate available forage to livestock on a sustained yield basis. Supply data in Table 1-12 indicates that demand exceeds supply. These data are preliminary and would be supplemented by monitoring studies prior to changing stocking levels.
- Protect riparian areas only enough to meet federal and state water quality standards;
- Remove all wild horses from the Grass Creek Resource Area;
- Implement all range improvements and plant treatments that would benefit livestock grazing except as constrained by MFP recommendations other than those intended to protect wild horses, wildlife, and the BLM standards listed on Table 1-6 (Table 1-13).

Alternative 4 (Manage for Other Grazing Uses)

Other grazing uses would be given preference over livestock grazing. Wild horse numbers would be limited to MFP recommendation level (100 head). Table 1-14 shows the expected demand for forage. It is assumed that big game numbers would not be allowed to expand beyond the Wyoming Game and Fish Department goals (Appendix C) since forage available on public land is not the only limiting factor for wildlife numbers. Conflicts between livestock use and other grazing uses would be eliminated by restricting or excluding livestock use. Stocking levels would be adjusted through monitoring if necessary. Actions and restrictions recommended in the resource activity recommendation phase (wildlife, soils, watershed, etc.) of land use planning would be implemented. These recommendations do not consider conflicts with other activity recommendations. Table 1-15 is a list of those actions and restrictions that would be applicable. Table 1-4 lists the prescribed management practices for "I" category allotments and Table 1-11 lists those for "M" and "C" category allotments.

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INTERRELATIONSHIPS

BLM's programs and proposals are closely related to the programs of other agencies and individuals. The following interrelationships exist.

Environmental Protection Agency

The Environmental Protection Agency (EPA) has been given initial responsibility for implementing Section 208 of the Federal Water Pollution Control Act Amendment of 1972. Under this act and Executive Order 12088, BLM is required to control water pollution that originates from large areas of public land (nonpoint source pollution). EPA is working through area-wide water quality management agencies and local Soil Conservation Service offices to complete plans for controlling water pollution in problem areas. Once the requirements of these plans are finalized, BLM will take the measures necessary to comply with them.

U.S. Fish and Wildlife Service

The Fish and Wildlife Service conducts predator control in the GCRA under agreement with BLM. The control consists of aerial shooting and limited trapping of coyotes, mostly during the fall, winter, and early spring. No chemical toxicants are used.

The Fish and Wildlife Service also serves as the consulting agency under the Endangered Species Act of 1973, and has responsibility for migratory birds.

Soil Conservation Service

The Soil Conservation Service is involved with permittees, and the Wyoming Department of Lands, in preparing cooperative or integrated "Ranch Plans." It is expected that SCS will become more involved in allotments that include significant portions of private and state land. This is particularly true in "M" and "C" category allotments where BLM will be spending less effort in plan preparation.

TABLE I-11

PRESCRIBED RANGE MANAGEMENT FOR ALTERNATIVES 3 AND 4 2/

Allotment Number	Management Category	Adjustment in Use		Grazing 1/			Range Improvements						Plant Treatments			
		Change in Forage Consumption	Change in Season of Use	Combinations			Fencing	Springs	Water Catchments	Reservoirs	Wells	Pipelines	Blue Grama Ripping	Sage Spraying	Prescribed Burn	Rotary Brush Cutting
				1	2	3										
0515	M															
0519	M															
0520	M															
0523	M				X				X			X		X		
0530	M			X								X				
0532	M	X			X											
0534	M						X	X				X				
0535	M															
0536	M				X											
0540	M				X			X								
0551	M				X			X		X						
0552	M	X						X								X
0553	M			X			X		X	X				X		
0564	M											X				
0569	M															
0572	M				X				X							X
0574	M							X				X				
0582	M				X											
0584	M				X											
0585	M	X														
0586	M															
0587	M															
0593	M															
0594	M				X		X				X			X		
0595	M				X			X								
0599	M	X														
0600	M	X			X											
0601	M	X														
0604	M	X					X		X	X	X	X				
0613	M				X											
0616	M			X						X						
0617	M															
0630	M															
0638	M							X				X				
0643	M									X						
0644	M															
0645	M															
0646	M							X							X	
0647	M															

TABLE 1-11 (Cont'd)

PRESCRIBED RANGE MANAGEMENT FOR ALTERNATIVES 3 AND 4 2/

Allotment Number	Management Category	Adjustment in Use		Grazing 1/			Range Improvements						Plant Treatments			
		Change in Forage Consumption	Change in Season of Use	Combinations			Fencing	Springs	Water Catchments	Reservoirs	Wells	Pipe-lines	Blue Grama Ripping	Sage Spraying	Prescribed Burn	Rotary Brush Cutting
				1	2	3										
0650	M										X	X				
0657	M															
0661	M	X														
0663	M															
0665	M							X			X	X				
0670	M				X										X	
0672	M	X														
0679	M															
0680	M	X														
2501	M															
2511	M															
2518	M				X										X	
2522	M															
2533	M															
2538	M															
2540	M															
2551	M															
2555	M															
2562	M									X						
0063	C ₁				X		X									
0504	C ₁				X					X						
0506	C ₁				X					X						
0512	C ₁				X							X				
0521	C ₁				X											
0527	C ₁				X											
0533	C ₁				X					X						
0539	C ₁				X											
0543	C ₁				X											
0546	C ₁				X							X				
0548	C ₁				X							X				
0554	C ₁				X					X						
0559	C ₁				X		X			X						
0561	C ₁				X											
0566	C ₁				X											
0567	C ₁				X					X						
0576	C ₁				X					X						
0577	C ₁				X											
0578	C ₁				X		X									

TABLE 1-11 (Cont'd)

PRESCRIBED RANGE MANAGEMENT FOR ALTERNATIVES 3 AND 4 ^{2/}

Allotment Number	Management Category	Adjustment in Use		Grazing 1/			Range Improvements						Plant Treatments			
		Change in Forage Consumption	Change in Season of Use	Combinations			Fencing	Springs	Water Catchments	Reservoirs	Wells	Pipe-lines	Blue Grama Ripping	Sage Spraying	Prescribed Burn	Rotary Brush Cutting
				1	2	3										
0580	C ₁			X												
0588	C ₁			X												
0697	C ₁			X												
0608	C ₁			X						X						
0610	C ₁			X				X								
0612	C ₁			X			X									
0619	C ₁			X												
0623	C ₁			X												
0636	C ₁			X												
0641	C ₁			X			X									
0648	C ₁			X												
0654	C ₁			X			X			X						
0653	C ₁			X												
0654	C ₁			X				X								
0664	C ₁			X												
0674	C ₁			X												
3103	C ₁			X												
0513	C ₂			X												
0528	C ₂			X												
0544	C ₂			X												
0549	C ₂			X												
0557	C ₂			X												
0583	C ₂			X												
0611	C ₂			X												
0618	C ₂			X												
0629	C ₂			X												
0631	C ₂			X												
0668	C ₂			X												
1065	C ₂			X												
1077	C ₂			X												
2527	C ₂			X												

- ^{1/} Combination 1 - Grazing treatments that include periods of no grazing for one or more years on different pastures.
 Combination 2 - Grazing treatments that include delaying the grazing period until a specified time on different pastures.
 Combination 3 - Grazing treatments that include delaying the grazing period until a specified time on a given pasture every year.

^{2/} This table to be used in conjunction with Table 1-4 for "I" and "C" category allotments.

TABLE 1-12
 FORAGE SUPPLY AND DEMAND FOR ALTERNATIVE 3
 (1,000 Pounds of Forage)

	<u>Demand</u>	<u>Supply</u> ^{1/}
Livestock	131,643	
Wildlife	16,679	
Wild Horses	<u>0</u>	
Total	148,322	72,441

^{1/} Based on preliminary forage production data.

TABLE 1-13

MANAGEMENT FRAMEWORK PLAN RECOMMENDATIONS FOR ALTERNATIVE 3

RM-1.1:

Permit livestock use (numbers, kind, and season of use) as currently authorized on "M" category allotments. Flexibility in livestock numbers and turnout and removal dates may be authorized so long as the flexibility is agreed upon through consultation with the operator, is explicitly written out and made a condition of the grazing permit or lease and does not allow grazing use in excess of the grazing preference.

RM-1.2:

Authorize increases in grazing use where monitoring studies show that the range is in good condition and that additional forage is permanently available. Such increases must be consistent with other multiple use objectives and with maintaining the range in good condition.

RM-1.3:

Allotment Management Plans (AMPs) may be developed on "M" category allotments but priority will be given to "I" category allotments. The BLM will cooperate with permittees or other agencies willing to take the lead in developing management plans for "M" category allotments.

RM-1.4:

Authorize the construction of livestock management facilities, primarily fences and water development, to facilitate livestock management and grazing distribution on the "M" category allotments. Authorize land treatment practices, primarily sagebrush eradication by chemical control or burning, to change vegetation composition for increased forage production. The facilities and land treatment work must be consistent with maintaining or improving satisfactory range conditions and productivity on "M" category allotments.

RM-2.1:

Permit livestock use (numbers and kind) as currently authorized on "C" category allotments. No livestock use will be permitted during the period May 1 to August 31. Flexibility in livestock numbers, turnout and removal dates may be authorized so long as the flexibility is agreed upon through consultation with the operator, is explicitly written out and made a condition of the grazing permit and does not allow grazing use in excess of the grazing preference.

TABLE 1-13

MANAGEMENT FRAMEWORK PLAN RECOMMENDATIONS FOR ALTERNATIVE 3
(Cont'd)

RM-2.2:

As an alternative to RM-2.1, the livestock permittees could develop a grazing system whereby livestock grazing could be continued during the period May 1 to August 31. Such grazing systems will conform to the following restraints:

1. No livestock grazing could occur prior to range readiness.
2. No grazing could occur prior to seedripeness on key plant species two years out of three.
3. No grazing would occur prior to seedripeness on key species until the grazing system is developed and until all needed livestock management facilities are installed.
4. The permittee is responsible for funding and implementing the necessary management facilities.
5. The grazing system must have BLM approval.

RM-2.3:

Authorize the construction of livestock management facilities primarily fences and water development to facilitate livestock management and grazing distribution in the "C" category allotments. The facilities must be consistent with protecting the existing resource values in "C" category allotments.

RM-2.4:

Allotment Management Plans (AMPs) may be developed on "C" category allotments but priority will be given to "I" and "M" category allotments. The BLM will cooperate with permittees or other agencies willing to take the lead in developing management plans for "C" category allotments.

RM-3.1:

Determine the appropriate stocking levels for "I" category allotments. Adjust livestock use levels to the estimated grazing capacity on all "I" category allotments by FY 1988. The grazing capacity will be determined through inventory, monitoring and consultation with affected parties.

Adjustments will be implemented as follows:

Livestock use will be permitted as currently authorized until adequate actual use, utilization, and climate data are collected to supplement the SVIM inventory data to determine needed livestock use adjustments. Adjustments will be initiated as soon as the data substantiates adjustments are warranted. Normally, 2 to 3 years data will be adequate. Adjustments

TABLE 1-13

MANAGEMENT FRAMEWORK PLAN RECOMMENDATIONS FOR ALTERNATIVE 3
(Cont'd)

will be initiated sooner where the operator concurs that an adjustment is needed and enters into an agreement with BLM for such adjustment.

Monitoring studies including actual use, utilization, and climate studies will be initiated on all "I" category allotments during FY 82. Condition and trend studies will be set up on a priority basis beginning FY 82. Trend data will provide a long-term evaluation of management actions.

The emphasis will be to bring grazing use into line with the estimated livestock grazing capacity on all allotments in a timely manner.

RM-3.2:

Develop and implement Allotment Management Plans (AMPs) for all "I" category allotments in accordance with 43 CFR 4120.2-3 by the end of FY 1988.

AMPs will be developed as scheduled below:

TABLE OF PRIORITIES*

	<u>High</u>	<u>Medium</u>	<u>Low</u>
Allotment	0633	0639	0579
Numbers	0634	0640	0614
	0642	2537	0615
	2539	0545	1071
	0678	0529	0516
	0596	0531	0635
	0620	2510	0681
	0621	0637	0671
	0622	0568	0503
	0626	0605	0590
	0509	0606	0537
	0510	2526	0538
	2508	0607	0556
	0522	0609	0558
	0652	0524	0573
	0662	0525	
	0669	0542	
	1070	0541	
		0560	
		0575	
		0507	
		0508	
		0526	
		0627	
		0628	

* Includes some allotments which are not "I" category but are integral part of the operation.

TABLE 1-13

MANAGEMENT FRAMEWORK PLAN RECOMMENDATIONS FOR ALTERNATIVE 3
(Cont'd)

RM-3.3:

Range improvements will be installed where needed to facilitate livestock management and improve range condition and productivity on "I" category allotments. The type, location, ownership, and general specifications of the range improvements will be determined in the AMP development.

Estimates of the extent of range improvement needs for the "I" category are:

- A. Fences - 100-140 miles
- B. New Reservoirs - 50-70 units
- C. Water Catchments - 20-30 units
- D. Water Wells - 5-15 units
- E. Water Pipelines - 45-55 miles
- F. Spring Development - 55-65 units
- G. Land Treatment Practices:
 - 1. Ripping dense blue grama stands - 40,000-43,000 acres
 - 2. Prescribed burning (sagebrush & juniper) - 8,000-9,000 acres
 - 3. Sagebrush chemical control - 20,000-28,000 acres

TABLE 1-14

FORAGE SUPPLY AND DEMAND FOR ALTERNATIVE 4
(1,000 Pounds of Forage)

	<u>Demand</u>	<u>Supply</u> ^{1/}
Livestock	59,587	
Wildlife	16,679	
Wild Horses	<u>1,080</u>	
Total	77,346	72,441

^{1/} Based on preliminary forage production data

TABLE 1-15

MANAGEMENT FRAMEWORK PLAN RECOMMENDATIONS FOR ALTERNATIVE 4

Recommendation W-1.1:

Vegetative manipulation should be done under the following constraints:

1. Do not allocate forage for livestock on slopes of over 25%.
2. Prevent grazing during the growth and flowering season of dominant forage plants.
3. Forage allocation for livestock, wildlife and wild horses must insure that 40 percent of the current year's growth remains intact.
4. Fence stream bottoms except for water gap at one mile intervals.

Recommendation W-1.2:

Mechanical activities in these areas should be done under the following constraints:

1. All surface disturbance should be minimized.
2. Limit road building, logging, and energy exploration to existing improved roads whenever possible.
3. Design surface disturbing activities with mitigation of erosion in mind.
4. Rehabilitate disturbed areas sequentially and as soon as possible following the disturbance.
5. Limit off-road vehicle travel to existing roads and trails.

Recommendation W-2.1:

Maintain range plant vigor, improve seed sources for new growth, and provide litter for ground cover by the following management practices:

1. Limit forage utilization to 30 percent on productive soils with fair or poorer range condition; 50 percent on productive soils with good or better range condition; 20 percent on unproductive soils with fair or poorer range condition; 40 percent on unproductive soils with good or better range condition.
2. Limit grazing during critical growth periods of key forage plants.

TABLE 1-15 (cont'd)

MANAGEMENT FRAMEWORK PLAN RECOMMENDATIONS FOR ALTERNATIVE 4

3. Classify slopes of over 25 percent and areas dominated by badlands as unsuitable for livestock grazing.
4. Seed native species on suitable areas to increase cover.
5. Allow unstable stream channels to stabilize by protecting the stream bottoms from livestock use.
6. Minimize wild horse populations and confine them to pastures having productive soils and good or better range condition.

Recommendation W-2.2:

Mechanically control head cutting, gully erosion, and sheet erosion and reduce sediment yield using the following means as soil and topography make them appropriate.

1. Sediment basins.
2. Contour furrows on deep soils.
3. Terraces on steeply sloping soils.
4. Diversion dikes around head walls.
5. Drop structures.
6. Water spreaders.
7. Ground cover increases by drilling native species.
8. Fencing of alternate one mile reaches of the valley fill to increase riparian vegetation for stream bank stabilization.
9. Brush control on deep soils.
10. Limit road building and confine vehicular traffic to existing, improved roads whenever possible.

Recommendation WL-2.3:

Reduce turbidity and siltation in streams and reservoirs by creation of vegetation or physical sediment traps and implementation of desirable watershed management practices within the drainage basins.

The Bighorn River, Greybull River, Cottonwood Creek, and Grass Creek can all be improved through these watershed practices.

TABLE 1-15 (cont'd)

MANAGEMENT FRAMEWORK PLAN RECOMMENDATIONS FOR ALTERNATIVE 4

Recommendation WL-2.4:

1. Fence livestock away from wetlands showing 20 percent or greater livestock damage or implement grazing practices which will reduce impacts to acceptable levels. Fencing is suggested until riparian areas have recovered and until grazing systems prove the ability to accomplish similar goals. Specific streams showing 20 percent or greater livestock damage in 1976 and in need of protection are listed on URA 3 tables .46 A2b(7) through .46A2b(11) and specific reservoirs showing heavy grazing impacts in 1977 are listed in the 6610 file report on reservoirs.
2. Improve and maintain stream exclosures to achieve wildlife benefits. Wetland exclosures should be viewed as a management measure, as well as a study site.
3. Cancel or suspend all remaining livestock grazing privileges on riparian tracts of the Bighorn River HMP. All BRH-HMP tracts should be fenced to control unauthorized grazing use, especially the "lower 80" tract (No. 5228B).

Recommendation WL-3.2:

Include the following salting stipulations on all grazing authorizations.

Livestock salt and mineral supplements should be placed a minimum of 400 yards (and preferably 1 mile) from wetland areas, away from travel routes and at least 200 yards from roads. It should be placed in large feeding locations, rock outcrops, knolls, or in "scrub" timber.

Recommendation WL-4.1:

Provide forage and cover for big game in accordance with goals of the Wyoming Game and Fish Department strategic plan shown on Addendum No.

1. Satisfy needs of small game by setting a base allocation.

Recommendation WL-4.3:

Reintroduce bighorn sheep in the Upper Owl Creek drainages, South Fork of Owl Creek Canyon, Rattlesnake Creek, Hyde's Hole, Castle Rocks, Mudstone Ridge, and Sugarloaf areas by 1985.

TABLE 1-15 (cont'd)

MANAGEMENT FRAMEWORK PLAN RECOMMENDATIONS FOR ALTERNATIVE 4

Recommendation WL-5.1:

1. Eliminate domestic livestock grazing through cancellation or suspension of privileges in the high elevation fragile alpine areas listed below:

Squaw Teat Butte
Mudstone Ridge
Castle Rocks
Upper Owl Creeks
2. Cancel grazing privileges permanently on those public lands where base properties are removed from livestock production businesses and developed into private subdivision.
3. Eliminate, or decrease, wild horse herds (Fifteenmile, Sand Draw) to levels that leave forage adequate to meet G&F mule deer and antelope long-term goals.

Recommendation WL-5.2:

Adjust livestock use to minimize competition with wildlife in the following areas and during the following seasons.

1. Delay livestock turnouts on spring elk range, calving areas, and early summer use areas to July 1, and after July 15 in high elevation areas. Reduce livestock grazing in prime elk summer/fall habitats to provide greater opportunity for elk. This is especially crucial in the following breeding ranges during the period of September 10-October 10.

Upper Owl Creeks
Upper Enos Creek
Upper Cottonwood drainages
Upper Left Hand Creek
Blue Creek
Leon Baird Peak
Sugarloaf Creek
Soapy Dale Peak
Nigger Creek
Noon Point
Upper Grass Creek
Deer Creek
Raspberry Draw
Thompson Draw
Hall Creek

and all areas within 2 miles of the FS boundary.

TABLE 1-15 (cont'd)

MANAGEMENT FRAMEWORK PLAN RECOMMENDATIONS FOR ALTERNATIVE 4

2. Maintain an earliest turn-out date of June 30th in blue grouse habitats.
3. Prohibit spring livestock use in antelope and deer fawning and crucial winter areas:

Left Hand Creek
Tennile Creek
Grass Creek
Fivemile Creek
Enos Creek
NE portion of the P.U.
Gillies Draw

All conflict areas have not been limited yet.

4. Allow only winter livestock grazing use on partridge habitat where bluebunch wheatgrass dominates.

Recommendation WL-5.3:

Encourage class of livestock changes to winter cattle from winter sheep in antelope crucial winter ranges. The northeast portion of the PU, Gillies Draw, Grass Creek, Enos Creek, and the Tennile/Fivemile areas are known as areas of conflict.

Recommendation WL-5.4:

Institute and enforce grazing systems to ensure rest pastures, and allocation of forage for wildlife. Insure at least one rest pasture each year in all allotments through AMP grazing systems.

Recommendation WL-5.5:

Modify all fences to conform with Bureau fence standards, or special standards as necessary, where natural movement is presently inhibited. Ban more restrictive fences than is necessary for livestock and game using a particular area.

Priorities for modification are net wire fences, highway right-of-way fences, sheep tight barbed wire fences with bottom wires less than 10 inches, 6-7 strand barbed wire fences, and fences over 38 inches in height, and fences in cattle use areas with a bottom wire less than 16 inches.

Allow no net wire type fences on antelope or deer travel routes and critical habitats.

Three strand barbed wire fences should be used on internal pasture fences and on ridgetops receiving little livestock pressure.

TABLE 1-15 (cont'd)

MANAGEMENT FRAMEWORK PLAN RECOMMENDATIONS FOR ALTERNATIVE 4

All new wire fences need to be flagged temporarily.

Place poles on top of fences at 38 inches height or build log fences in timber areas.

Place 3-rail fences where total height does not exceed 36 inches on steep slopes and thus take into account problems posed to game in crossing fences on such slopes. Avoid fences on such slopes and use flat bench areas and right angles in the fences on bench areas.

Stipulate on grazing permits that all fences on public land have gates left open when not required for livestock confinement.

Identify and remove all fences that are unnecessary, down, and hazardous. Line Point, Grass Creek, Enos Creek are some of the known areas of such fences.

Recommendation WL-5.8:

Develop habitat management plans (HMP's) in an order that the more important habitats are intensively managed first. HMP's should be developed in the following priority:

1. Several upland HMP's based on a single AMP or group of allotments. These HMP's would be developed and funded in conjunction with AMP's for the same area. Priorities are the higher elevation, higher rainfall, higher productivity areas before the desert areas.
2. HMP's developed on wild horse management areas in conjunction with wild horse management plans.
3. HMP's developed in conjunction with forest management plans.
4. An HMP developed with a primary focus on aspen stand renovation.

Recommendation WL-5.9:

Develop, protect, and maintain waters in the form of water catchments, guzzlers, springs, wells, pipelines, snowbank meltwater pits, drip pipes, and overflow areas in potential habitats currently unused by wildlife due to lack of water and succulent vegetation. Connect with private well systems for extended pipelines. Candidate areas for developments are Coal Draw, Sand Draw, side drainages of Cottonwood Creek, and Squaw Teats.

Develop water designed to be kept open during cold, dry early winter periods on crucial winter ranges, for winter use only.

Provide off-site watering facilities to maintain habitat integrity. Water troughs should be half buried, equipped with bird ladders, and half of the surface covered to prevent evaporation loss.

TABLE 1-15 (cont'd)

MANAGEMENT FRAMEWORK PLAN RECOMMENDATIONS FOR ALTERNATIVE 4

Expand the catchment area of guzzlers to provide overflow water which establishes succulent vegetation.

Create cover avenues to and from water and wet meadow sites by planting. Cover in the form of brush piles, etc., should be provided as access and security around developed waters. Protection of vegetation should be an integral part of design. Use these areas as key areas for management goals in AMP's and HMP's so succulent forages area available to wildlife during dry periods.

Fence overflow areas on troughs and provide drip pipes and fences areas along pipelines to provide water and succulent vegetation areas for wildlife use.

Insure that water is available to wildlife before and after livestock use an area by grazing permit stipulations.

Recommendation WL-5.10:

Develop water spreaders at suitable sites throughout the planning unit to create wet meadow habitats for wildlife.

Recommendation WL-5.13:

Burn numerous small areas of decadent sagebrush stands to improve and maintain balanced mosaics of multiple age structure browse.

Areas for prescribed burn include:

Upper Owl Creek
Upper Grass Creek
Upper Cottonwood Creek
Left Hand Creek
Sugarloaf Creek
Iron Creek
Twenty-one Creek
Little Buffalo Basin
Putney Flat
N. side of Tatman Mountain
Upper Prospect Creek
Hyde's Hole
Upper Wagonhound Creek
Rock Creek

Other areas may also exist.

TABLE 1-15 (cont'd)

MANAGEMENT FRAMEWORK PLAN RECOMMENDATIONS FOR ALTERNATIVE 4

Recommendation WL-5.14:

Re-establish, by planting, 3,000 acres of aspen stands where herbicide spraying, old age and decadence, conifer invasion, and grazing has reduced productivity and distribution of aspen communities.

Addendum No. 3 lists some practices and considerations of aspen management in the PU.

Recommendation WL-6.13:

Do not develop spring, summer or fall livestock waters on crucial elk, antelope, or mule deer winter ranges, thus avoiding summer and fall concentrations of livestock and wildlife to the degradation of crucial winter areas. Ranges where no spring, summer, or fall livestock waters should be developed include:

Owl Creek
Nigger Creek
Lime Point
Milk Creek
Jones Flat
Twenty-one Creek
Sugarloaf Creek
Left Hand Creek
Lake Creek
Renner Draw

ALTERNATIVES INCLUDING THE PROPOSED ACTION

Wyoming Department of Game and Fish (G&F)

The G&F has established goals and objectives for wildlife management on public lands within the GCRA. Because wildlife habitat would be affected by the proposed grazing management (especially the stocking rates), there has been coordination between BLM and G&F in developing the proposed action. Specifically, the G&F has cooperated with BLM in determining existing big game numbers and projecting 1990 desirable herd sizes for the GCRA. Continuing joint studies are being conducted on big game winter ranges and migration routes, as well as sage grouse strutting grounds. The G&F would also review all proposals for land treatment and co-operate in Sikes Act projects.

Wyoming Department of Environmental Quality (DEQ)

BLM has an informal agreement with DEQ which provides for information exchange and agency coordination in solving water and air quality problems in the state.

Wyoming Land Commission

The Wyoming Land Commission administers 76,000 acres of land within allotments in the GCRA. These lands are leased by livestock operators for grazing on ten-year terms. Most of the state lands are intermingled with BLM-administered lands, making separate management impractical.

State Historic Preservation Officer

The GCRA objectives and the guidelines for implementation of range improvements have been designed to comply with the Memorandum of Agreement between the BLM, the Advisory Council on Historic Preservation, and the National Conference of State Historic Preservation Officers. A copy of the Cultural Resources Inventory reports is submitted to the State Historic Preservation Officer.

County Planning

Portions of Hot Springs, Washakie, Big Horn and Park counties are included in the GCRA. The Federal Land Policy and Management Act of 1976, Title II, Section 202(c) states, "Land Use Plans of the Secretary under this section shall be consistent with federal law and the purposes of this act." The county planning commissions were consulted during the land use planning process prior to development of this EIS, and the proposed action is felt to be compatible with their concerns.

U.S. Forest Service

Some of the livestock operators on BLM lands also hold USFS permits. Changes in seasons on either BLM or USFS lands often create a demand for change on the other agency's lands. Much of the wildlife use is also seasonally on USFS and BLM lands and cooperation between the two agencies and G&F is ongoing. USFS was consulted in development of the proposed action and will continue to be included in the decision making process for specific operations.

CHAPTER 2

AFFECTED ENVIRONMENT

INTRODUCTION

This section describes the resources in the Grass Creek Resource Area that are most likely to be affected if the proposed action or one of the alternatives were implemented. Resources such as wilderness would not be affected are not discussed unless it is necessary to provide a basis for analysis. Other resources such as air quality, geology, threatened or endangered plant species, the grizzly bear, peregrine falcon and Northern Rocky Mountain grey wolf, wilderness, prime or unique farmlands, areas of critical environmental concern (ACECs), or wild and scenic rivers have been analyzed and would not be affected. The primary data sources are Bureau planning documents (i.e., Unit Resource Analysis, Planning Area Analysis, and Management Framework Plan) that are available for review at the Worland District Office.

VEGETATION

The Grass Creek Resource Area (GCRA) has nine major ecological communities: basin grassland/shrubs, mountain grassland/shrubs, wet meadow, salt bottom, riparian shrub/tree, desert shrub and foothills shrubs/woodland, mountain shrub/woodland, and waste/disturbed. Each ecological community is characterized by different kinds and proportions of plant species in a particular land area (range sites). Acres of ecological communities and corresponding range sites which were inventoried are displayed in Appendix D. Figure 2-1 shows the locations of ecological complexes, rather than range sites, because the interspersed range sites make them difficult to delineate. Reference can be made to the Site Write-Up Area (SWA) maps available at the Worland District which delineate range sites, and complexes of range sites.

The Soil Vegetation Inventory Method (SVIM) was used to inventory the area based on range sites and Order III soil survey between 1977 to 1979 (BLM Manual 1731 and Worland District SVIM mapping guidelines). Compilation of data by allotment is available at the Worland District Office. There are also eleven allotment management plans in the area which have been implemented and

monitored in varying degrees over the last ten years.

Dr. H. G. Fisser of the University of Wyoming has collected soil and vegetative data in the Bighorn Basin since 1962 and his annual reports are available in the district office.

Soil/Range Site Relationships

The potential plant community on each major soil in the area was predicted and a range site was assigned by the Soil Conservation Service range specialists using the procedures of the National Range Handbook. Complete range site descriptions are available in the Worland District Office.

Ecological Condition

Ecological condition is the present vegetative composition of an area in relation to the natural potential (climax) plant community for that area. Plant composition for each climax ecological site was taken from the Soil Conservation Service range site guides (SVIM mapping guides).

In the GCRA, 333,000 acres (27 percent) were noted in good to excellent condition, 503,000 acres (41 percent) fair, 166,000 acres (14 percent) poor, 219,000 acres (18 percent) unclassified, and 300,000 acres not inventoried. The unclassified areas were inventoried range sites which have no corresponding SCS range site description. Appendix D summarizes the existing condition of inventoried allotments in Grass Creek.

Apparent Trend

Apparent trend is a one time observation to determine apparent changes in ecological condition. Actual trend is determined by studying changes over a long period in vegetation and soil characteristics resulting from grazing and natural factors. Apparent trend was determined in SVIM by comparing plant vigor, reproduction, litter, and watershed inventory data with the range site comparison areas found in Grass Creek.

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Presently, 62,000 acres (10 percent) of the inventoried area show an apparent upward trend; 73,000 acres (12 percent) a declining trend, and 495,000 acres (79 percent) with apparent stable trend. Some 589,000 acres were unclassified because comparison range sites were not located. Another 300,000 acres were not inventoried. Apparent trend estimates are shown by allotment in Appendix D.

Productivity

Vegetative production is the air-dry weight in pounds per acre of the total annual plant material produced up to 4.5 feet above ground level. Production data were gathered by range site and condition class, and by species during the SVIM inventory.

The present total yearly vegetative production (including trees, shrubs, annuals) for the inventoried area is 621 million pounds, of which 72 million pounds is considered forage production available for proper use by livestock, wildlife and wild horses. Vegetative production by composition and forage production data by allotment are listed in Appendix D.

Suitability

Suitability refers to the capability of forage-producing land to be grazed by livestock on a sustained yield basis without damage to the soil and vegetation. Suitable range should not be confused with 'usable' range. Many areas can be grazed by livestock and hence are usable, but these areas may not be suitable for grazing on a long-term basis because of the damage to them or to adjacent areas.

Suitability was determined by evaluating forage production, steepness of slope, and distance from water. The criteria applied are based on summer cow use. Allotments which have winter livestock use would have higher suitability percentages because livestock travel farther from water when air temperatures are cool or when snow is available for water. These suitability criteria reduced the total forage available for livestock in the inventoried area by 18 percent. The percent of livestock forage suitability by allotment is shown in Appendix D. Locations of unsuitable range in each allotment are available at the Worland District Office.

Riparian

Grass Creek has 2,500 acres (.002 percent) of vegetation associated with streams and reservoirs on public lands consisting of sedges, grasses, rushes, cattails, cottonwoods and willows. These communities are found along perennial and intermittent streams, around reservoirs, and at spring sites.

Poor distribution of livestock due to the lack of seasonal water and steep slopes throughout the area has concentrated the animals in stream bottoms and meadow riparian areas. This has resulted in many years of heavy utilization and trampling, causing poor ecological condition (SVIM data).

SOILS

The soils in the GCRA have formed in parent materials derived from shales, sandstones and igneous rocks. In general, they are poorly developed and are closely related to the underlying bedrock.

The BLM-SCS soil survey in the area was completed in 1979. Based on survey information, the GCRA has been divided into 37 soil associations which are in one of four major groups (see Soils Maps, Figure 2-2 and 2-3). A summary of the soil units, their component series, properties, and acreages appears in Appendix E.

The soil association numbers 27-37, except 29, (Group I) are in the most arid portion of the resource area (5 to 9 inch precipitation zone). They occupy 55 percent of the public lands surveyed. They are shallow to deep and are typically well drained, with high salt and gypsum concentrations in the upper part of the soil profile. These soils support the least vegetation production, and are the most susceptible to long-term disturbance. The soil association numbers 2-18, 25, 26, and 29 (Group II) are in the 10 to 14 inch precipitation zone. They occupy 27 percent of the public lands surveyed. They are shallow to deep, typically well drained, and some have high salt and gypsum concentrations. The soil association numbers 19 and 21 (Group III) are primarily in the 10 to 14 inch precipitation zone but have colder average annual soil temperatures than those in Groups I and II. They occupy 8 percent of the public lands surveyed and are shallow to deep, typically well drained, often steep, and stony. In general, salt and gypsum concentrations are low in Group III soils relative to those in Groups I and II. The soils of groups II and III are variable in vegetation production and suscep-

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tibility to disturbance. The soil association numbers 20, 22, 23, and 24 (Group IV) occur primarily in the 15 to 19 inch precipitation zone. They occupy 6 percent of the public lands surveyed. They are shallow to deep, typically well drained, usually steeply sloping and stony to very stony. These soils support the most vegetative production and are least susceptible to long-term disturbance.

Soil Erosion

Soil erosion is the displacement and loss of soil materials. Approximately 65 percent of the public lands surveyed have a moderate to severe erosion potential because of a combination of unstable parent materials, weak soil aggregation, steep slopes and low rates of soil moisture infiltration. These low infiltration rates result from high salinity and alkalinity, fine texture and shallow depth.

Many of the low and mid-elevation soils are easily weathered because they are fine textured, soft in consistency, and have high soluble salts. This results in high erodibility, which produces high sediment yields and degraded water quality.

At higher elevations, soils are on mountain foothills and gently to steeply sloping terraces. They generally are coarse-textured, gravelly soils derived from volcanic tuffs and sandstones of low to moderate hardness. Because of steep slopes and comparatively high precipitation these soils are moderately erodible.

Floodplain soils are also highly erodible because of high salt contents and weak aggregation of soil materials. A survey of selected streams on public lands (BLM, 1977 unpublished) indicates that about 75 percent of the stream banks are eroding.

We used the Pacific Southwest Interagency Committee (PSIAC) method for measuring sediment yield (refer to Appendix E for explanation). In the existing environment sediment yield averages about 1.12 acre-feet/square mile/year (2,240 tons/sq.mi./year). In all, about 1,750 acre-feet/year (3,500,000 tons/year) of sediment originates in the GCRA.

Note that the PSIAC method measures sediment accumulation and movement into stream channels and reservoirs. Total soil displacement on uplands exceeds the quantity entering streams, and is not completely measured by the PSIAC method. Thus, the PSIAC sediment yield data are minimum estimates of soil displacement and loss.

Soil Productivity and Compaction

Soil productivity is the soil's capacity to support vegetation. This soil feature encompasses natural fertility, water infiltration and holding capacity, stability of the soil surface, and the influence of plant roots and cover. Compaction of soil material destroys soil porosity and moisture infiltration capacity, thereby decreasing root respiration and water holding capacity. Vegetation removal decreases the source of organic material entering the soil profile and also decreases moisture infiltration capacity. Soil compaction, mechanical disruption of the soil profile, and removal of vegetation cover are measurable impacts on soil productivity.

WATER

Ground Water

Most wells in the EIS area produce water from an average depth of about 300 feet or less and yield 10-15 gallons per minute (gpm). The quality of water produced from ground water sources (usually the Willwood and Fort Union formations) is usually suitable for wildlife and livestock use.

Surface Water

The EIS area contains portions of four large (greater than 125,000 acres) perennial drainages and one large ephemeral drainage. All of these drainages flow directly to the Bighorn River, a major tributary of the Yellowstone River. These perennial drainages all have their headwater in the Absoroka Mountains and include Owl Creek, Cottonwood Creek, Gooseberry Creek, and the Greybull River. Fifteenmile Creek is the largest ephemeral drainage within the EIS area and has its headwaters east of Meeteetse. The average runoff in the area is .16 inch/acre/year (Missouri River Basin Framework update 1975).

All of the area streams have wide variations of discharge from season to season and year to year. The mountain streams normally discharge large volumes of water during the late spring and early summer. The volume and duration depends on winter snow accumulation and spring weather conditions. In many cases, streamflow is sustained during fall and winter months by ground water discharge (USDI, BLM 1980).

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The ephemeral drainages do not normally discharge significant volumes of water during the winter months since winter snows usually remain on the rangeland until the spring melt. However, in late spring, summer, and fall these streams discharge water in direct and immediate response to precipitation events. For example, flow from Fifteenmile Creek may change from zero to over 1,000 cubic feet per second (cfs) and then back to zero within three to four days after an intense thunderstorm.

Human activities have accelerated natural erosion and increased surface water salinity in some areas. However, sediment from erosion is the most serious water quality problem in the EIS area (Regional Planning Office 1979). Severe erosion is most evident in the Fifteenmile drainage where deep headcuts may advance over 100 feet a year. Suspended sediment loads from the drainage averaged 603,000 tons/year from 1952 to 1972 (USDI, BLM 1980). Cottonwood Creek, although not a sediment producer on the magnitude of Fifteenmile, also has the potential to release large amounts of sediment during high runoff conditions.

Water quality is poor because of bacteria contamination in the lower elevations. Sampling by BLM during 1979 found that the State of Wyoming standard of 1,000 fecal coliform/100 ml for Class II streams was exceeded frequently. The fecal coliform/fecal streptococci ratio, indicates the fecal contamination most commonly associated with livestock and wildlife grazing activities. Appendix F summarizes standard violations and impairments in the GCRA.

Water Use

The major consumptive use of water on public lands is for stock and wildlife, although some water is used by the energy industry. To accommodate areas which are not supplied naturally with water, BLM has constructed 370 reservoirs with an initial storage capacity of 1,900 acre feet, and has drilled 55 wells from which an estimated 25 acre feet of ground water is withdrawn yearly (USDI, BLM URA 2).

WETLANDS

Wetlands include the waters and vegetation associated with perennial and intermittent streams, reservoirs, springs, seeps, and canals (Table 2-1). These habitats are intensively used by livestock

and are recognized as the most important habitat for fish and wildlife.

Streams

About 80 miles of perennial streams, those that generally flow all year, exist on public land. Although the 80 miles contain only about 100 acres of channel habitat and 250 acres of associated riparian vegetation they represent an important fish and wildlife habitat type on public land in the EIS area. Intermittent streams, those flowing sufficiently long to support growth of riparian vegetation, contain at least ten times the amount of wetland habitat as do perennial streams (USDI, BLM URA 3 1980).

Nearly 75 percent of the perennial stream miles examined on public land are declining in stability and habitat values for both fish and wildlife. Fifty percent of the stream miles that are stable are already in poor condition (Appendix G). Similarly, the associated riparian vegetation is generally in poor condition with only about 20 percent in good condition (USDI, BLM URA 3, 1980).

Fish Habitat

Trout species are restricted to upstream reaches while nongame species primarily occupy middle and downstream reaches (USDI, BLM URA 2 1980). The absence of fish in some stream reaches is attributed to low flows. The lack of pool and bank habitat cover and spawning areas in Owl Creek and Cottonwood Creek limits trout populations (Richards and Holden 1980).

Existing stream habitat conditions are characterized by the lack of riparian bank cover, scouring of the channel bottom, erosion of stream banks, and sediment deposition (Bowers et al. 1979). Channel widening occurs in the Cottonwood Creek and Owl Creek drainages when dammed banks are washed away during annual high flow periods (Behnke and Zorn 1976; Winegar 1977; Behnke 1979). Increased peak flows result from loss of vegetation on the watershed and contribute to bank scouring and washing away of spawning gravels (Kennedy 1977). The widened channels in the Owl and Cottonwood Creek drainages lack trout support capability due to reduced water depth, loss of bank and pool cover, and lack of spawning areas.

Siltation and turbidity resulting from watershed and stream bank erosion have reduced habitat quality in nearly all streams (Dahlem 1979; Platts 1979). Silt deposits cover spawning gravels in mid-

TABLE 2-1

WETLAND HABITAT BY ALLOTMENT CATEGORY

	Allotment Category				With a Livestock Exclosure	Total Units	Total Acres or miles of Habitat
	M	I	C1	C2			
Reservoir Sites with Water Through July (number)	62	276	79	4	0	421	2,105
Sites With a Known Fish Population (number)	1	3	0	0	0	4	-
Total Reservoir Sites (number)	152	573	155	8	0	888	NA
Perennial Stream Segments (number)	33	64	9	0	3	109	52
Segments with a Known Fish Population (number) ^{1/}	27	40	8	0	3	78	-
Oil Field Discharge Channel Segments (number)	4	6	4	0	0	14	24
Springs (number)	44	101	8	0	-	153	-
Intermittent Streams (number)	-	-	-	-	-	-	800
Seeps (No data)	-	-	-	-	-	-	-
Canals (No data)	-	-	-	-	-	-	-

^{1/} About 50% of these segments contain game fish.

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elevation streams and have eliminated trout reproduction and reduced aquatic invertebrates which serve as fish food. Turbidity and sediment are also major fishery problems in the low elevation streams and the large rivers bordering the EIS area.

Loss of watershed vegetation causes higher peak flows that wash out drainage channels, lower the water table, and reduce water infiltration into the soil. With less seepage from the water table, flow ceases sooner in intermittent streams and may reduce low flows even further during late summer in perennial streams (Glinski 1977; Bowers et al. 1979).

Wildlife Habitat

More species of wildlife use stream zones than any other habitat type in the EIS area (Fitton and Howe 1980).

The quality of stream habitat for wildlife is generally declining or in poor condition. The habitat is characterized by dead or dying cottonwood trees and a lack of young trees. This is most apparent along intermittent and low elevation perennial streams where channels have deepened because of erosion. Lowered water tables associated with deepened channels decrease low flows, reduce vitality of existing trees, and prevent the survival of new seedlings (Behnke and Raleigh 1978). Seedling establishment is prevented in gully-channels except in protected areas (Glinski 1977). Lack of nonwoody vegetation also limits wildlife support capability in riparian zones.

Reservoirs

Approximately 400 stock-watering reservoirs in the EIS area hold water through July. These provide about 2,000 acres of wetland habitat for fish and wildlife.

Fish Habitat

Siltation reduces water depth and the ability of fish to survive the winter in typical reservoirs. Only four reservoirs are known to contain fish. These are located in the Dorsey Creek drainage and are mainly used as part of an irrigation system which stores water from the Greybull River. Wardell Reservoir, the largest of the four, supports a sport fishery and contains numerous fish species.

Wildlife Habitat

The wildlife populations on stock-pond sites are influenced by reservoir size and the wetland vegetation (USDI, BLM URA 3, 1980). The number of ducks using a reservoir for resting and feeding in the EIS area increases with reservoir size and presence of aquatic vegetation. Most ducks nest at well vegetated reservoirs. The number of mammals and nongame bird species is highest on reservoirs with structural habitat diversity consisting of trees and shrubs, ground cover, and aquatic plants.

Reservoir conditions for wildlife range from poor to good. Nearly 60 percent of the sites evaluated have poor habitat and less than 20 percent of the reservoirs have good wetland vegetation diversity and density (USDI, BLM URA 3 1980). High levels of suspended solids prevent submerged plants from being established. Growth and proliferation of emergents, trees, and shrubs are often prevented. As silt is deposited, habitat values decline because reservoirs dry up more frequently. Total loss of wetland values occurs when insufficient water is captured to support wetland species.

Springs, Seeps, and Canals

Vegetation associated with these areas is similar to that found along streams and reservoirs. Habitat condition and trends are also similar. Canal areas are the least abundant habitat type on public lands.

WILDLIFE

The following discussion focuses on threatened and endangered species, economically important species, and animals or groups of animals that would be significantly affected by the proposed action and alternatives. An extensive, detailed discussion of the wildlife populations and habitat can be found in the Grass Creek Planning Unit documents (USDI, BLM 1980). Major ecological complexes are shown in Figure 2-1 and explained in Appendix H.

Pronghorn Antelope

The estimated post-hunting season antelope population in 1980 was about 3,000 animals, while the Wyoming Game and Fish Department goal for the herd unit encompassing the Grass Creek EIS

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area is a 4,500 post-season population. During severe winters more antelope migrate in from northwest of the EIS area. Figure 2-4 shows the distribution and seasonal use areas of antelope in the Grass Creek EIS area.

Deer

Mule deer, with an estimated winter population of 8,000 and a summer population of 7,400 animals, are the most common big game animal. The Wyoming Game and Fish Department goal, for the herd units in the Grass Creek Resource Area, is 9,700 animals in winter and 8,600 animals in summer. Figure 2-5 shows the distribution and seasonal use areas of mule deer. Population and productivity are below capacity, with local exceptions (e.g., Gooseberry Creek, Greybull River).

A limited number of nonmigratory white-tailed deer inhabit most drainages in the EIS area. Their habitat is restricted primarily to agrarian and riparian areas (Figure 2-6). White-tailed deer are browsers.

Elk

About 75 percent of the area's elk migrate between the higher elevations of the west portions of the EIS area, the Shoshone National Forest, and the ridges and slopes of the intermediate elevations (6,000 to 7,500 ft.). Only 40 percent of the area's elk inhabit "I" category allotments (Figure 2-7). The estimated elk population in the winter of 1979 was 1,200. The Wyoming Game and Fish Department goal for this area is 1,450 animals. Elk productivity is rated from poor to good.

Generally, elk are grazers and their diets include more grass species than the diets of antelope or deer. Water does not appear to limit elk range.

Bighorn Sheep

The area's estimated bighorn sheep population is about 50 in the winter and 15 in the summer. Wyoming Game and Fish Department (G&F) has a goal of 91 sheep in winter/spring, and 23 in summer. The sheep population is slowly declining. Bighorns feed most on grass although they do consume some forbs and browse (see Figure 2-6 for distribution).

Moose

Distribution of Shiras moose is shown on Figure 2-6. There is a winter population of about 50 animals and a summer population of about 70. Wyoming Game and Fish Department goals for moose in this area are 70 in winter and 80 in summer.

Moose eat shrubs and forbs year-round. There is an estimated 15 percent dietary overlap between moose and cattle.

Upland Game Birds

Sage grouse, blue grouse, chukars, and gray partridge (Huns) live in the Grass Creek Resource Area. Although sage grouse are common, their populations have declined in the past three decades. There are 33 known strutting/breeding/nesting sites in the GCRA. Figure 2-8 shows current sage grouse distribution. Blue grouse are common in the forested areas (Figure 2-8). Chukars are common where suitable habitat occurs and gray partridge (Huns) are widespread, but not abundant (Figure 2-9).

Threatened or Endangered Species

No official critical habitat for a threatened or endangered species has been declared for any species within the GCRA. Consultation with the U.S. Fish and Wildlife Service has been initiated regarding threatened or endangered species.

Black-Footed Ferret

White-tailed prairie dog towns are potential ferret habitat and are common in the EIS area. In 1981, black-footed ferrets were discovered within five miles of the EIS area.

Bald Eagle

At least one pair of bald eagles nest in the EIS area and several winter roosting sites occur on, and adjacent to, the EIS area.

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RECREATION

Most recreation in the Grass Creek EIS Area involving local residents includes hunting, fishing, camping, sight-seeing, off-road vehicle (ORV) use and "general leisure" pursuits (USDI, BLM 1980). "General leisure" recreation activities in the EIS area include hiking, rock hounding, backpacking, a variety of sight-seeing pursuits, and ORV use associated with these activities. General leisure recreation values and use typically are dispersed, and depend on the natural character of the surrounding landscape. Thus, the quality of the recreation experience as it occurs in a semiprimitive or natural environment is often more important when assessing recreation values than the number of visitor days per activity.

Transient visitors en route to Yellowstone Park and other destinations outside of the EIS area enjoy sight-seeing and other short-term, incidental activities. The important elements of this recreation activity concern the aesthetic quality of public lands visible from transportation routes and the vast number of people who potentially benefit from this resource.

Hunting, fishing and associated activities are the most significant recreation pursuits in the EIS area. These are not incidental to activities in other areas (Table 2-2). Although the Wyoming Game and Fish Department is the primary agency responsible for regulating hunting and fishing, BLM has an important influence on fish and wildlife population and distribution through habitat and surface management. BLM's responsibility for ensuring access to public lands affects hunting and fishing, as well as other recreation activities.

VISUAL RESOURCES

The EIS area includes mountainous area, foothills, rolling sage and grass plains, and a colorful high desert. Its scenic quality ratings are assigned according to topography, vegetation, water and color. Areas with rugged ridges, sheer rock outcrops, scattered stands of pine and aspen, and clear, cascading streams received the highest scenic ratings possible. Areas with flat topography and uniform sage and grass received the lowest ratings.

These scenic ratings are further refined by their visibility from important viewing points. A viewing point could be a highway, campground, or other recreation area, and its importance depends on the number of people using it and their probable atti-

tudes. Thus, a moderately scenic area that is visible from an important tourist route or recreation area receives as much protection as less visible but highly scenic area.

Class I and V are special designations that are not represented in the EIS area. The degree of impact allowed for each of the other classes is shown below.

Class II — Impacts may be seen, but should not attract attention.

Class III — Impacts may attract attention, but should not be a dominant feature.

Class IV — Impacts may be a dominant feature, but should repeat the lines, slopes, and colors found in the area.

The management classes along with key scenic features of the study area are shown on Figure 2-10 and Table 2-3.

CULTURAL RESOURCES

Approximately 250 prehistoric sites have been recorded in the EIS area. The cultural sequence includes a well defined record of occupation from early Paleo Indian (11,200 B.P.) to historic times.

Five major overlapping historical periods spanning from mid 19th century to the present, apply to the EIS area (Western Interpretive Services 1978). Known historic sites that have potential for listing in the National Register of Historic Places are listed in the Unit Resource Analysis (USDI, BLM 1980).

WILD HORSES

Wild, free roaming horses are found in two locations of the Grass Creek Resource Area. The Fifteenmile wild horse herd has approximately 250 animals and the Sand Draw herd numbers approximately 50 head (District Inventory, August 1980). Forage requirements are 900 lbs. of forage per month for each horse. Both herds are in good condition with a high proportion of horses under five years of age.

The number of horses, in 1971, when the Wild Horse Act (P.L. 91-195) was signed, has been established at 190 head. In 1978, 150 head were removed from the Fifteenmile herd due to drought conditions. Presently with the wild horses numbering approximately 300 head the condition of the animals is "good." Over the years, colt crops have

TABLE 2-2

ESTIMATED HUNTING & FISHING ACTIVITY

<u>Activity</u>	<u>Annual Recreation Days</u>	
	<u>Resident</u>	<u>Nonresident</u>
Hunting ^{1/}		
Mule Deer	3,400	1,100
Antelope	700	400
Elk	800	100
Small Game	6,900	N/A
Waterfowl	1,800	N/A
Fishing ^{2/}	400	N/A

Source: USDI, BLM, URA 1980 and data derived from Wyoming Game and Fish Department Harvest Reports.

^{1/} Hunting on public lands only.

^{2/} Fishing on all lands (public, private, and state) in the GCRA.

TABLE 2-3

VISUAL RESOURCE MANAGEMENT CLASSES^{1/}

<u>Class</u>	<u>II</u>	<u>III</u>	<u>IV</u>	<u>Total</u>
Acres	91,000	402,000	1,028,000	1,521,000
Percent of EIS area	6	26	68	100

^{1/} Includes all lands (public, state, and private).

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averaged 15 to 20 percent annually indicating a "healthy viable population" (Conley 1979).

The wild horses presently occupy 13 allotments, covering approximately 285,000 acres. They occupy higher elevations during the summer and winter, and the lower elevations in the spring and fall.

Existing fences prevent wild horse access to other areas. At this time, no interior fences exist within the proposed Herd Management Area (HMA) (Figure 1-3). Private land within the wild horse areas presents a management problem, because it is unfeasible to keep wild horses off unfenced private lands.

Wild horses compete with livestock and wildlife for forage and water, especially during drought conditions. Available winter water is a problem during years when the reservoirs freeze and no snow is available. During these conditions wild horses concentrate on flat country around reservoirs where they try to break ice to get drinking water. Occasionally, horses fall through the ice and drown.

LIVESTOCK GRAZING

Appendix B summarizes the livestock grazing in the Grass Creek Resource Area. Average total use authorized by BLM on the area's federal, state, and private land in the past five years was 127,400 AUMs. Livestock grazing is managed by individual allotment. The area has 162 allotments but some boundaries are unfenced and some common use occurs. Grazing privileges have been established through adjudication. Although many allotments contain nonfederal properties, grazing capacity for the entire allotment is determined by BLM. Several operators hold national forest permits and 76,000 acres of state lands fall within BLM allotments.

Cattle, sheep and horses are licensed to use public land. Grazing use is mainly spring/summer/fall but some grazing allotments have yearlong use (see Appendix B). Most sheep use is winter/spring in the desert shrub portion of the area. Both cow/calf and grazing cattle operators are present in the area and sheep operators use both shed and range lambing practices.

Production of cattle and sheep is an important land use within the GCRA. Currently, 94 permittees graze livestock on the 162 allotments, encompassing or including 965,000 acres of public land. Cattle account for 75 percent of the authorized use. The remainder is sheep and domestic horses.

SOCIOECONOMIC CONDITIONS

The Bighorn Basin is characterized by a stable economy, moderate population growth, and rural communities which generally provide services at levels commensurate with the size of the populations they serve (USDI, BLM 1977). The economic base is tied to the land and natural resources such as mining, oil and gas extraction, agriculture and recreation/tourism.

Agricultural production is a major business activity in the Bighorn Basin in terms of output, employment, and income. It also has secondary employment and income effects as well as deep roots in the community social and cultural structure. The livestock industry comprises about one fourth of all agricultural activity in the Bighorn Basin and is especially important in Hot Springs and Big Horn counties (USDI, BLM 1977).

Population and Social Attitudes

The 1980 population of the Bighorn Basin was 40,475 (U.S. Bureau of Census). During the last decade, the population has increased by 20 percent.

A discussion of the public attitudes and values is available in the Socioeconomic Profile of the Bighorn Basin (USDI, BLM 1977) and the Planning Area Analysis (USDI, BLM 1979). Generally, residents like the Bighorn Basin as it is and want to avoid excessive change or growth that could damage the quality of life.

Many ranchers see the public lands as having their highest and best use in livestock grazing. Other uses are viewed as a potential conflict with grazing and a threat to the rancher's economic independence.

Dependence of Users on BLM Grazing Permits

The total authorized livestock forage from public lands amounted to about 20 percent of the total forage requirements of operators' herds. Since dependency is seasonal, it is common to graze public lands in the spring and summer, to conserve forage on private land for winter use. Thus, livestock operators often depend on forage from public lands to maintain the size of their livestock operations.

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BLM Grazing Permits and Ranch Property Values

The Bureau of Land Management does not recognize grazing permits as vested property rights; however, effects on private asset valuation may occur. Estimates of the capital value of grazing permits associated with ranch properties in the Bighorn Basin, have ranged from about \$30 to \$60 per AUM.

Financial Viability of Ranch Enterprises

The ability of ranch enterprises to adjust to a loss of grazing privileges is related to their ability to assume additional debt and higher fixed costs. When an operator's authorized livestock use is reduced, he probably reduces his herd size. This may reduce some variable costs but not fixed costs. Thus, the proportion of fixed costs, such as debt payments, increases and the operation becomes more inflexible because a greater portion of the operation is used to cover fixed costs. Subsequently, a debt free operator can borrow more to make adjustments in his operation, and also has less debt commitment if the operation is scaled down.

Additional debt service capacity (the amount of money available to pay interest and principle on new debt) is estimated in terms of "return above cash costs" in representative livestock budgets (Appendix I). The return above cash costs in these budgets reflects the amount of money available to the operator after paying household expenses, depreciation and replacement of capital equipment, and repayment of interest and principle on loans. Thus, a change in return above cash cost can indicate the effect of changes in grazing permits on a ranch operation.

Local Income and Employment

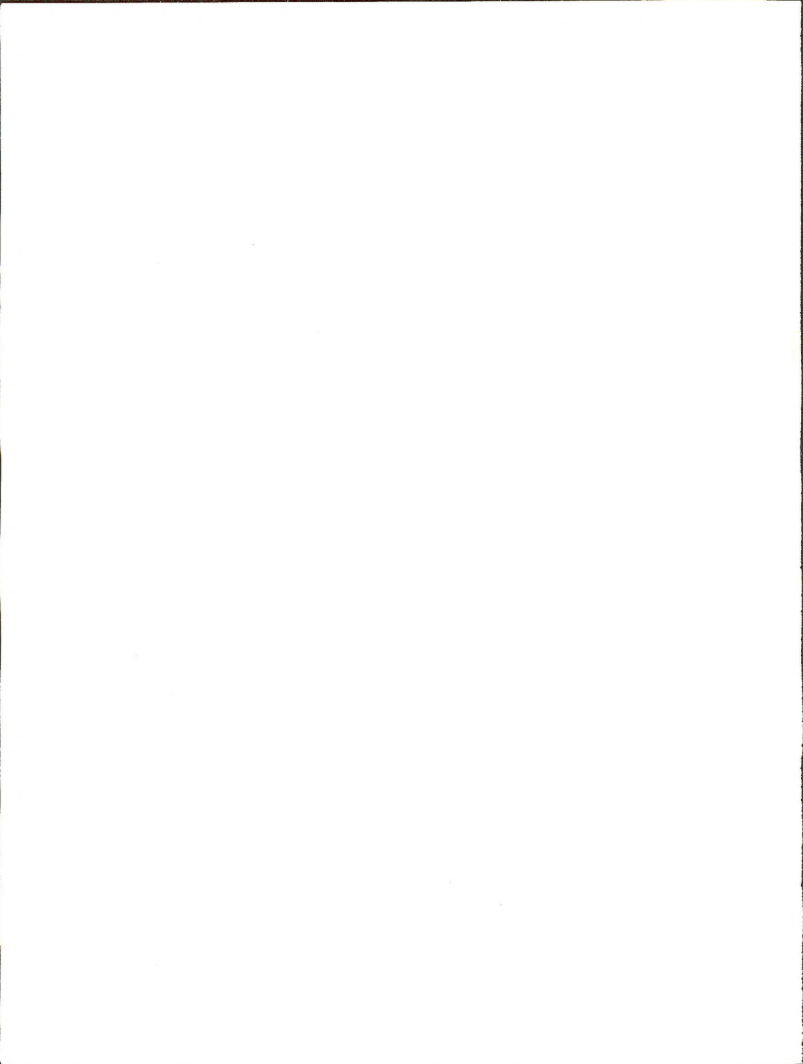
In 1978, \$17 million in local farm income was derived from agricultural production in the Bighorn Basin (U.S. Dept. of Commerce, Bureau of Economic Analysis 1981). This was about 13 percent of total personal income.

The household income multiplier for the livestock sector of the Bighorn Basin is 2.58 (USDI, BLM 1977).

Household income multipliers measure the total change in household income throughout the economy resulting from a one dollar change in household income payments made by a particular sector. The 2.58 household income multiplier for the livestock industry indicates that a one dollar change in payments made to households by livestock firms will cause a \$2.58 change in total household income. Included in the \$2.58 are the initial one dollar change in livestock household payments plus \$1.58 household income generated in other sectors of the local economy.

The 1978 farm employment in the Bighorn Basin was about 2,700, and the livestock industry comprised about one fourth of all agricultural activities in the Basin. The equivalent of about 50 full time jobs (full time equivalents (FTE)) could be attributed to livestock production on public lands in the Grass Creek Resource Area. Since the livestock sector employment multiplier is 1.64 for the Basin, total employment generated by livestock production (direct, indirect, and induced) in the local economy is about 80 FTE. The employment multiplier reflects change in FTE's in the economy, given a change of one FTE in a particular sector. Thus, the 1.64 employment multiplier for the livestock industry means that one FTE change in the livestock sector would result in .64 FTE change in the local economy.

The estimated local income derived from 1975 expenditures on recreation in the Grass Creek Resource Area was about \$50,000. The estimated local employment associated with 1975 recreation expenditures was 10 FTE.



CHAPTER 3

ENVIRONMENTAL CONSEQUENCES

INTRODUCTION

The environmental effects addressed in this chapter are limited to those that are considered significant in terms of environmental or economic consequences or are considered controversial from a public issue standpoint.

The impact analysis was based on the assumptions that:

1. Short-term impacts would occur within 5 years following completion of the EIS. Long-term impacts would occur 6 to 20 years following the EIS.
2. Where magnitude and location of actions are unknown the worst-case impacts have been analyzed. This means: (A) for "M" and "C" category allotments, preference level grazing is the stocking rate; and (B) preference level grazing on "I" category allotments would continue during the initial monitoring period.
3. Under the proposed action and Alternative 3, there would be adjustments made in present levels of grazing use. These adjustments would occur from six months to 6½ years following completion of this EIS depending upon the amount of monitoring needed. It is not possible, at this time, to indicate which allotments would experience adjustments at what time or to what extent because data from monitoring and consultation information is not yet available. Therefore we assumed it would take an average of 3½ years following the FEIS before initial adjustments would occur. Present forage supply levels listed in Chapter 1 and Appendix D are used as a basis for the assumed extent of adjustment needed. The projected change in vegetation condition resulting from adjustment is the basis for estimated long-term forage supply. It is further assumed that long-term stocking levels would be commensurate with long-term forage supply under the proposed action and Alternatives 3 and 4.

VEGETATION

In this section, the impacts expected on the vegetative resource from proposed utilization levels, grazing treatments, and range improvements are analyzed with regard to ecological condition, apparent trend, forage production, meadow riparian vegetation for the proposed action and alternatives. Refer to Table 3-1 for a summary of vegetation impacts.

Several impact assumptions were made to predict and analyze the long-term changes expected from the proposed action and alternatives. The following assumptions are based upon observations within the EIS area, review of pertinent literature, and professional judgment:

1. The proper application of all grazing treatments listed in the proposed action, with utilization levels not exceeding 50 percent of key species in key areas, would improve ecological condition by one condition class (for example poor to fair, or fair to good) within 20 years.
2. Proper application of deferment treatments at 50 percent utilization would maintain the present conditions.
3. Plant treatments, when followed by rest from grazing to allow key species to respond and when managed in accordance with a properly designed grazing system, will result in good condition.

Refer to Appendix D for a literature review and highlights of pertinent research and methodology for impact projections.

Treatment acres proposed represent a maximum opportunity for treatment rather than a projected goal.

Ecological Condition and Trend

Proposed Action

The proposed action would improve condition and cause an upward trend on the "I" category allotments and maintain or prevent degradation of conditions in the "M" and "C" allotments.

TABLE 3-1

SUMMARY OF VEGETATION IMPACT ASSESSMENT

Vegetative Characteristic	Existing Situation	Proposed Action	Alternative			
			1	2	3	4
			No Change	No Livestock Grazing	Optimize Livestock Grazing	Manage for Other Grazing Uses
<u>Ecological Condition-Acres</u>						
(thousands)						
Good/Excellent	333	711	298	836	737	812
Fair	503	229	510	128	215	170
Poor	166	62	194	38	50	20
Unclassified (519)						
1,521 Total						
<u>Apparent Trend-Acres</u>						
(thousands)						
Upward	62	501	60	600	531	516
Static	495	120	495	30	93	111
Downward	73	9	75	0	6	3
No Comparison Area Data and Not Inventoried	891					
Total	1,521					
<u>Forage Production</u>						
Lbs. (million)	72	92	68	106	102	98

TABLE 3-1

SUMMARY OF VEGETATION IMPACT ASSESSMENT
(Cont'd)

Vegetative Characteristic	Existing Situation	Proposed Action	Alternative			
			1 No Change	2 No Livestock Grazing	3 Optimize Livestock Grazing	4 Manage for Other Grazing Uses
Riparian Vegetation Condition-Perennial Streams (350 Acres P.L.)						
Improving	18	203	18	350	18	315
Static	70	31	70	0	70	35
Declining	263	116	263	0	263	0
Reservoirs (2100 Acres P.L.)						
Improving	630	1600	630	2100	1000	2100
Static	1470	500	1470	--	1100	--
Declining (No Data)	--	--	--	--	--	--

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- Poor condition range would improve, resulting in a 63 percent decrease in the acreage in this class.
- Fair condition range would improve, resulting in a 54 percent decrease in the acreage in this class.
- Good/excellent range acreage would increase by 100 percent.
- Acreage of upward trend would be 8 times the present.

Allotment grazing treatments, utilization levels and brush treatment will be designed to improve vigor and reproduction of key species, therefore, these plant species would increase and thus improve condition. Poor condition areas would have less potential for improvement and an anticipated slower rate of recovery than fair or good condition areas. This difference is due to the low percentage of key forage plants, competition with annual and brush species, and low key species vigor in the poor condition areas.

Allotments with intensive management systems (AMP's), range readiness turnouts, utilization limits, range improvements, and vegetative manipulations would benefit in the following manner:

- Suitable rangeland would increase;
- Utilization and livestock distribution would improve;
- Good/excellent range condition would be maintained;
- Plant vigor, seed production, and litter accumulation would improve;
- Reproduction of key species would improve.

The construction of new range improvements would cause both a temporary (1-5 years) disturbance of vegetation and result in a long-term (6-20 years) change of key species composition. Refer to Table 3-2 for acreage by alternative.

The new water developments would have a localized adverse impact on vegetation. Livestock would congregate around these developments resulting in trampling damage and severe utilization of forage species. These developments would increase the acreage of range suitable for livestock and improve livestock distribution. Proposed pasture fencing would allow for implementation of grazing treatments for improvement of key plant species.

Proposed vegetative manipulations using 2,4-D herbicide, prescribed fire, and blue grama ripping would:

- Reduce native shrubs, juniper trees, and, depending on method, some broadleaf forbs in

treated areas until they re-establish in the long term;

- Stimulate native herbaceous understory such as perennial grasses and forbs;
- Kill or damage vegetation in adjacent nontarget areas if accidents occur.

Individual plant response to herbicide application and prescribed fire are given in Table 3-3, 3-4, and 3-5. Refer to Appendix D for pertinent literature review and highlights.

Alternative 1 (No Change In Existing Livestock Management)

This alternative would result in an overall minor decline in long-term trend and condition. Those allotments which have utilization levels higher than the acceptable limits would continue to decline and others would continue to make slight improvement. The taking of nonuse by some permittees and above normal precipitation accounts for a portion of the present good condition and improving trend. If intensive management is not implemented, many areas would continue to change to a shrub and tree (limber pine, juniper) dominated community. Many of the areas which are in poor and fair condition have stabilized as the result of being dominated by blue grama and big sagebrush. The lack of rest from grazing during the critical spring growing season with this alternative would result in continued:

- Poor plant vigor;
- Poor seedling establishment;
- Lack of litter accumulation.

Alternative 2 (No Livestock Grazing)

Under the "no livestock grazing" (Alternative 2), the following would occur in 20 years:

- Major shift toward climax plant community species;
- Increase in vegetative diversity;
- Due to past grazing, some vegetative types may not reach their potential;
- Good/excellent condition acres would increase 250 percent;
- All but a small amount of acreage would have an upward trend.

Some vegetative types would not make significant improvement during the 20-year period due to the competition by invader and increased plant spe-

TABLE 3-2

ACRES OF VEGETATIVE DISTURBANCE FROM RANGE IMPROVEMENTS

	Water Developments ^{1/}		Fences		Veg. Manipulation ^{2/}	
	Temporary	Long Term	Temporary	Long Term	Temporary	Long Term ^{3/}
Proposed Action	146	44	25	0	75,400	75,400
Alternative 3	195	60	60	0	103,600	103,600
Alternative 4	190	57	40	0	89,400	89,400

^{1/} Includes springs, reservoirs, wells, pipelines and water catchments.

^{2/} Includes sagebrush and limber pine control, and blue grama ripping.

^{3/} Consists of significant changes in species composition.

TABLE 3-3

MAJOR SPECIES REDUCED BY 2,4-D HERBICIDE TREATMENT

Big Sagebrush	<u>Artemisia tridentata</u>
Aster	<u>Aster spp.</u>
Onion	<u>Allium spp.</u>
Lupine	<u>Lupinus spp.</u>
Death camas	<u>Zigadenus spp.</u>
Dandelion	<u>Taraxacum officinale</u>
Fringed sagebrush	<u>Artemisia frigida</u>
Biscuitroot	<u>Lomatium spp.</u>
Penstemon	<u>Penstemon spp.</u>
Larkspur	<u>Delphinium spp.</u>
Tumblemustard	<u>Sisymbrium altissimum</u>
Paintbrush	<u>Castilleja spp.</u>
Arrowleaf balsamroot	<u>Balsamorhiza sagittata</u>
Skunkbush sumac	<u>Rhus trilobata</u>
Milkvetch	<u>Astragalus spp.</u>
Winterfat	<u>Eurotia (Ceratoides) lanata</u>

TABLE 3-4

EFFECTS OF FALL/EARLY SPRING
BURNING FOR SELECTED SPECIES

<u>Severely Damaged</u>	<u>Slightly Damaged</u>
Big sagebrush	Bluebunch wheatgrass
<u>Eriogonum</u> species	Indian ricegrass
Idaho fescue	<u>Penstemon</u> species
Phlox species	Squirreltail
Needleandthread	<u>Astragalus</u> species
Limber pine	Sedges
Juniper	Basin wildrye
	Prairie Junegrass
	Aspen
	Skunkbush sumac
 <u>Undamaged</u>	
Cheatgrass	
Crested wheatgrass	
Balsamroot	
Sandberg bluegrass	
Snowberry	
Yarrow	
Western wheatgrass	
Lupine	
Rhizomatous wheatgrass	
Rabbitbrush	

Source: Wright et. al. (1978)

TABLE 3-5
RECOVERY RATES FOLLOWING BURNING
FOR SELECTED SPECIES

Species	Comments
Bluebunch wheatgrass	Normal production reached one to three years following burn.
Needleandthread	Normal production reached three to eight years following burn.
Idaho fescue	Five to twelve years required for completed recovery.
Prairie Junegrass	One to three years required for recovery.
Big sagebrush	Ten percent of normal production recovered after twelve years; normal production returned after 30 years.
Rabbitbrush	Reduced one to three years after burn; three times normal after twelve years; on sandy soils, four to nine times normal after eight to eighteen years.

Source: Wright et. al. (1978)

ENVIRONMENTAL CONSEQUENCES

cies such as cheatgrass brome, blue grama, and sagebrush.

Alternative 3 (Optimize Livestock Grazing)

As under the proposed action, Alternative 3 with intensive management systems, turnout adjustments, utilization limits, range improvements, and vegetative manipulation would result in improved condition and trend.

- Poor condition range would improve, resulting in a 70 percent decrease in the acreage in this class.
- Fair condition range would improve, resulting in a 57 percent decrease in the acreage in this class.
- Good/excellent range would more than double.
- Acreage in upward trend condition would be 8.6 times the existing situation.

Total of 255 acres would be disturbed temporarily by water developments and fences.

Under this alternative, there would be the potential to treat 103,600 acres of public land. This vegetative manipulation will cause a significant change in species composition from scrubs and forbs to grasses.

The acreage which would be included in AMPs and improvement plans would be all allotments having potential for such plans and not just "I" category as in the proposed action.

Alternative 4 (Manage for Other Grazing Uses)

As under the proposed action, Alternative 4 would improve and maintain condition through the following:

- Immediately reduced livestock grazing;
- Delayed turnout dates (range readiness);
- Improved distribution and utilization through water developments;
- Vegetative manipulation;
- Implementation of AMPs to benefit nonlivestock resources.

The following changes would be expected within 20 years (Table 3-1):

- Poor condition range would improve, resulting in an 88 percent decrease in the acreage in this class;
- Fair condition range would improve, resulting in a 65 percent decrease in the acreage in this class;

- Good/excellent range would increase 2.4 times;
- Upward range trend would increase 8.4 times present.

Most impacts described under the proposed action would apply to this alternative. However, due to reduced grazing levels at an earlier time, there would be greater improvement in condition and trend and the improvement would occur in a shorter time period.

A total of 230 acres will be disturbed temporarily by water developments and fences. Vegetative manipulation will cause a significant change in species composition on 89,000 acres.

Forage Production

The combined effects of the various management practices described for each alternative would affect long-term forage production (compared to present production) as follows:

- Proposed action would increase forage production by 28 percent;
- No change from present management would result in 6 percent decrease;
- Alternative 2 would increase forage production by 47 percent;
- Alternative 3 would increase forage by 42 percent;
- Alternative 4 would increase forage production by 36 percent.

The proposed action and Alternatives 2, 3, and 4 would all increase forage production by improving the ecological condition of the range. The proposed action and the latter two alternatives would do so by management practices that actively promote change to a higher ecologic condition. Alternative 2 would accomplish the same thing by passively allowing the process to occur in the absence of livestock grazing. Alternative 1, no change from present management, would eventually result in decreased production from the cumulative effects of range deterioration that have occurred and in some instances continues to take place.

Table 3-1 shows the forage that would be available for grazing uses under each of the alternatives.

Riparian Vegetation

The proposed action would improve and increase riparian vegetation in the "I" allotments. In the "M"

ENVIRONMENTAL CONSEQUENCES

and "C" allotments, riparian vegetation would generally continue to decline. Refer to Table 3-1 for impacts by proposed action and alternatives.

General View

Proposed Action

1. Acres of perennial stream associated vegetation in improving condition would increase from 5 percent (18 acres) to 58 percent (203 acres).
2. Acres of perennial stream associated vegetation in declining condition would decrease from 75 percent (263 acres) to 33 percent (116 acres).
3. Acres of reservoir associated vegetation in improving condition would increase from 30 percent (630 acres) to 76 percent (1,600 acres).

Increases in improving vegetative condition and decreases in declining vegetative condition are attributed to the "I" allotments (Table 3-1). Sedges and grasses would respond faster to limited use in grazing systems. Woody vegetation, such as willows and shrubs respond much slower and without total rest would never reproduce or recover. Riparian habitat in "M" and "C" allotments would continue to slowly decline without limitations on grazing or protective fencing. Riparian vegetation in some "C" allotments may slightly improve due to the May 1-August 31 livestock grazing restriction. During the remainder of the year, the riparian areas would be available to livestock.

Newly developed springs would be fenced to protect riparian vegetation of spring sources. Water would be diverted to livestock troughs. Riparian vegetation would be reduced at spring sources by diverting the water but increased on overflow areas as a result of fencing.

Alternative 1 (No Change in Management)

The continued downward trend can be expected in riparian vegetation. An increase in less productive and palatable forage will result. Substantial degradation of riparian vegetation would be the end product.

Alternative 2 (No Livestock Grazing)

The condition of all riparian vegetation would improve. No livestock grazing would enhance succession in the riparian community. Sedges and grass would become more abundant. Woody vegetation would respond more slowly but would continue to increase shade and cover areas.

Alternative 3 (Optimize Livestock Grazing)

This alternative would have the same effect as the "no change in management" alternative. Utilization of riparian vegetation would be accelerated without other constraints. Livestock grazing retards plant succession in the riparian zones. Vegetative improvements in the sedge/grass community would be minimal where grazing systems are implemented. Existing woody vegetation would become decadent with no reproduction or increase.

Alternative 4 (Manage for Other Grazing Uses)

Riparian vegetation would improve as in the no grazing alternative. The vegetative condition and composition would improve. The increased abundance of riparian vegetation along with higher quality forage would benefit all users.

SOILS

Soil Erosion

Soil erosion is a function of soil surface cover and moisture infiltration capacity, e.g., vegetation removal and soil compaction increase soil erosion. Since season and intensity of grazing affect the degree to which soil erosion occurs, adjustments in grazing could change rates of soil erosion. Permanent (long-term) impacts to soils are persistent or recurrent beyond 5 years, while temporary (short-term) impacts are nonrecurrent impacts lasting less than 5 years. Among the use adjustments proposed, deferring grazing would promote the most extensive increases in vegetative cover and the best protection from soil compaction during the critical spring thaw period. Plant cover increases only when pastures are rested during the growing season. Compaction would not occur during rest periods. By resting a given pasture during other times of the year, increases in cover would depend on periodic, above normal precipitation.

Estimated sediment yield is listed in Appendix E. The factors of the Pacific Southwest Interagency Committee (PSIAC) equation factors that change as a result of grazing use adjustments are ground cover, runoff, land use, and erosion. These factors were adjusted according to changes in range condition class and percent vegetative cover. Total ground cover includes vegetative cover, coarse fragments larger than sand, and plant litter; both persistent (woody and rooted) and nonpersistent (nonwoody or unrooted).

ENVIRONMENTAL CONSEQUENCES

Based on SVIM data, about 40 percent (238,000 acres) of public lands in the "I" allotments have less than optimal vegetative cover. This is defined as the vegetative cover present when range condition is good to excellent, based on SCS Range Technical Guidelines. Appendix E lists estimated sediment yield by allotment in the "I" category. Table 3-6 displays sediment yield and average cover for the baseline situation, proposed action, and alternatives.

Soil Productivity and Compaction

Impacts on soil productivity are listed in Table 3-7. This table presents the acreages on which soil production has been degraded in the existing environment, and would be degraded with the proposed action and alternatives. Impacts from Alternative 1 would be similar to those of the existing environment, so they are listed together. Impacts from Alternative 2 are based on gradual expiration of current grazing permits within 10 years, so they are considered as temporary. Existing range improvements would remain, but would cause long-term impacts only to acres they occupy.

The construction of range improvements removes vegetation and exposes soils to impacts from rain and runoff, which make soils more susceptible to erosion. Improvements that require excavation, such as pipelines, cattleguards, springs, storage tanks, and reservoirs, disturb soil profiles more than other types of improvements. Even with site reclamation some types of range improvements would cause short-term soil loss and increased sediment yields. When reclamation is complete long-term soil loss would be reduced or eliminated.

Construction would disturb soil profiles and vegetation on about 3 acres per reservoir, about an acre per spring and mile of fence, about 2 acres per water catchment and about 2 acres per mile of pipeline. Water flow would permanently decrease and drainage vegetation would deteriorate on an average of 50 acres downstream from each reservoir.

Blue grama ripping, or mechanical removal of undesirable vegetation, would temporarily disturb the upper soil horizon and remove vegetative cover. Excessively high soil surface temperatures during prescribed burning would destroy shallow roots and remove soil moisture on about 10-20 percent of burned areas.

Soil compaction is a consequence of livestock trampling, especially when soil moisture content is high during heavy rains and the spring thaw. It lowers soil permeability and moisture capacity and

it increases runoff. Plant cover, an indicator of soil productivity, also suffers directly from trampling and decreased soil moisture. There can be long-term impacts from soil compaction on areas of prolonged, intense grazing use. Deferring grazing to avoid spring thaw through seed ripe would reduce compaction because areas would be unused during periods of high soil moisture, critical plant growth and vulnerability. However, compaction would continue as a significant impact with alternating rest treatments, because pastures would still be grazed during this critical period, about one in three acres at any one time. The proposed action would decrease the acreage grazed during this critical period, compared to the existing environment and Alternative 1, in which about one third of the acreage would be impacted. Alternative 4 would have the same effect as the proposed action and also would improve grazing practices so that only about one in four acres would have compaction from critical period grazing. Alternative 3, although not deferring grazing, would also change the impact to one in four acres. Alternative 2 would eliminate all critical period grazing and the compaction impact.

Thus, the majority of acres of soil compaction are associated with alternating rest and deferred treatments and with springs, reservoirs, and wells. Acres of compaction for range improvements are based on average areas affected per improvement. About 40 acres around each water source would experience grazing concentration and soil compaction (see Table 3-7 for comparison of alternatives).

WATER

Table 3-8 summarizes anticipated impacts on surface and ground water resources.

Water would be lost to downstream users under all alternatives, except Alternative 1, due to improved range condition and the construction of water storage facilities. Total decreases in runoff, when compared with the existing environment, are 1,300 acre feet/year for the proposed action; 1,700 acre feet/year for Alternative 2; 2,300 acre feet/year for Alternative 3; and 1,600 acre feet/year for Alternative 4. The reductions in runoff would not significantly affect existing water rights, on major streams or rivers, since they represent lower peak flood flows for a particular rainfall event.

Small increases in ground water use would occur with the proposed action and Alternatives 3 and 4. Ground water use would occur from wells drilled in the floodplain, or the Terrace, Willwood and Fort Union formations. The wells would probably yield 5-

TABLE 3-6

SEDIMENT YIELD AND AVERAGE VEGETATIVE COVER BY ALTERNATIVE^{1/}

	Acre Feet Per Square Mile	Total Yield (acre feet per year)	Average Vegetative Cover (%)
Existing Environment	1.12	1,750	26
Proposed Action	0.62	970 (6) ^{2/}	29
Alternative I	1.50	2,350	12
Alternative II	0.35	550	34
Alternative III	0.56	880 (8) ^{2/}	30
Alternative IV	0.40	640 (7) ^{2/}	33

^{1/} These figures are for the surveyed public lands.^{2/} Figures in parentheses are estimates of sediment yield in ac.ft./yr. resulting from prescribed plant treatments, and are included in the totals.

TABLE 3-7

ACRES OF DECREASED SOIL PRODUCTIVITY ^{1/}

	Existing Environment/ Alternative 1		Preferred Alternative Proposed Action		Alternative 2		Alternative 3		Alternative 4	
	Temporary ^{2/}	Permanent	2/ Temporary	Permanent	Temporary	Permanent	Temporary	Permanent	Temporary	Permanent
Total Acres	0	287,120	311,410	183,680	287,120	1,110	317,280	257,800	313,480	147,370
Adjustments in Use ^{3/} (Total)	0	268,000	268,000	178,300	268,000	0	268,000	251,000	268,000	141,000
Range Improvements ^{3/} , ^{4/} (Total)	0	19,120	310	5,380	-	0	380	6,800	380	6,370
Fencing	-	-	150	-	-	-	200	-	200	-
Springs	-	820	-	2,400	820	10	-	3,280	-	3,280
Water Catchments	-	-	60	-	-	-	60	-	60	-
Reservoirs	-	15,900	-	2,580	15,900	1,100	-	3,440	-	3,010
Wells	-	2,400	-	400	2,400	-	-	80	-	80
Pipelines	-	-	100	-	-	-	120	-	120	-
Plant Treatments ^{3/} , ^{4/} (Total)	0	0	43,100	0	0	0	48,900	0	45,100	0
Blue Grama Ripping	-	-	41,800	-	-	-	46,000	-	42,200	-
Prescribed Burning	-	-	1,300	-	-	-	2,900	-	2,900	-

^{1/} Soil Productivity is the soil capacity to support range vegetation, and it includes the moisture regime, soil profile stability, fertility, and the influence of plant roots. Soil compaction is included as an impact on soil productivity.

^{2/} Temporary means impacts that are mitigated by reclamation; permanent means persistent impacts with no reclamation.

^{3/} Although Range Improvements and Plant Treatments will take place over the long term, the impacts are considered as beginning whenever each adjustment, improvement, or treatment is implemented.

^{4/} Figures are for improvements or treatments in addition to those in the existing environment.

TABLE 3-8
SUMMARY OF IMPACTS TO WATER RESOURCES

	Existing Environment	Proposed Action	Alt. 1	Alt. 2	Alt. 3	Alt. 4
Surface Runoff ^{1/} Ac. Ft./Year	20,000	18,700	20,100	18,300	17,700	18,400
Ground Water Use, BLM Wells, Ac. Ft./Yr.	25	30	20	0	35	35
Sediment ^{1/} Delivered to Bighorn River Tons/Year (000)	2,600	1,500	3,500	825	1,320	960
Herbicide Concentration (micrograms/liter)	0	1-2	0	0	1-2	1-2

^{1/} See Appendix F for Rationale and Calculations

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10 gallons/minute and would not be in critical ground water regions.

As runoff and sediment yields (Table 3-6, Soils) decline, suspended sediment delivered to the Big-horn River would also decline, thus improving water quality. The greatest reduction in suspended sediment transport would occur under Alternative 2 with a reduction of approximately 1,800,000 tons/year. The proposed action would reduce suspended sediment by 1,100,000 tons/year.

It is expected herbicides would reach surface waters under the proposed action, and Alternatives 3 and 4. However, studies by the USGS in Wyoming (USGS 1980) concluded that areas of intense herbicide use (picloram, 2,4-D and dicamba) concentrations, found in water, did not contribute dangerous or harmful concentrations to humans or the environment.

Water developments in upland areas would redistribute livestock and slightly reduce fecal coliform concentrations with the proposed action. Kunkle (1970) determined that coliform bacteria in streams arise from areas adjacent to the stream, and upland areas contributed minor amounts. Overall improvements would be slight, and coliform concentrations would probably continue to exceed 1,000 colonies/100 mls of water.

WETLANDS

Attributes which make wetlands important for wildlife cause them to be more intensively used by livestock than terrestrial habitat types. Therefore, wetland management objectives are not normally achieved when grazing systems are designed for the adjacent terrestrial sites because livestock concentrate in the wetland zone (Meyers 1981).

Proposed Action

Streams

The proposed action would improve stream and riparian habitat for fish and wildlife in category "I" allotments within the 20-year analysis period. Improvements would result from management actions that provide long rest periods for bank and channel restoration and tree seedling survival to occur. No improvement in habitat condition is expected in the short term (5 years) because only monitoring and limited implementation of grazing systems would take place during this period.

Fish Habitat

Fish habitat would improve when public land segments on streams such as South and North Fork Owl and Cottonwood Creeks only if they were rested for several years to initiate restoration of bank and channel habitat. Examples of where habitat and fish population have been restored within livestock enclosures are numerous (VanVelson 1979, Winegar 1977, Duff 1979, and others). However, full recovery of fish populations may not occur in small enclosures where altered watershed runoff patterns prevent channel and bank habitat restoration (Kennedy 1977).

Treatments involving rest should slow the rate of fish habitat degradation but would not reverse the trend. Proposed grazing management in "M" and "C" allotments would generally perpetuate the fish habitat trends discussed in Chapter 2.

Wildlife Habitat

Wildlife habitat would be restored within perennial and intermittent stream enclosures following 4 or 5 years rest. This rest is assumed necessary if young trees are to survive livestock use in riparian zones. Growth of grasses and forbs along streams would increase during grazing system rest periods but most growth generally would be consumed or trampled during subsequent grazing and tree seedling survival would be minimal. Riparian habitat in "M" category allotments would generally continue their trends as discussed in Chapter 2.

Reservoirs

Development of wetland fish and wildlife habitat at reservoir sites depends on water supply, seed sources, topography, and livestock use. If livestock use is intensive and prolonged, plant growth is inhibited and habitat is degraded. This results from trampling, consuming vegetation, and disturbing soil in and around the reservoirs. Improvements in habitat condition for fish and wildlife would begin at each site as soon as rest or deferred treatments or fencing are implemented and would continue through the 20-year analysis period. Little improvement is expected in the short term due to lack of grazing system implementation during this time.

Fish Habitat

A few of the 60 proposed new reservoirs would be built to support game fish where sites are suitable. Fishery habitat would be maintained if rest treatments were adopted to increase vegetation and reduce sediment and turbidity in the water.

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Wildlife Habitat

Waterfowl would benefit most from rest treatments which leave enough vegetation for nesting and rearing purposes (Evans and Kerbs 1977 and Eng, Jones, and Gjersing 1979). Waterfowl and other wildlife would also benefit from habitat improvement resulting from implementation of the proposed management actions at existing and new reservoirs. Trends and condition of reservoir habitat in "M" category allotments would remain as discussed in Chapter 2.

Springs, Seeps, and Canals

Vegetation associated with these type wetlands would respond to proposed grazing system management in the same manner as vegetation around reservoirs. Most opportunities for improving these wetland habitats in "I" category allotments exist through implementation of the proposed management actions. Effects of proposed spring developments on wildlife varies as previously discussed.

Alternative 1 (No Change in Existing Livestock Management)

This alternative would generally cause a continuation in the trend of wetland habitat conditions discussed in Chapter 2. Figure 3-1 illustrates the type of impacts that would result from intensive livestock use of streams and uses trout only as an indicator of habitat condition. Similar type impacts generally occur to reservoir and other wetland habitats from intensive livestock use of the sites and watersheds.

Alternative 2 (No Livestock Grazing)

All public land stream segments would improve in channel, bank, and riparian habitat condition during the 20-year analysis period. Fish habitat may not necessarily achieve full potential due to altered flow patterns and erosion from upstream areas. Fish habitat would be further improved as projects were implemented.

In the short term, reservoir associated vegetation would increase to the potential of each site as would waterfowl production and most other wildlife use. Longevity of reservoirs would increase as a result of moderated flows and reduced sediment inflow from the watershed and from protection provided to the dam, spillway, and shoreline by vegetation. Inflow would generally decrease due to reduced runoff but most reservoirs would still fill each year. Vegetation responses associated with springs,

seeps, and canals would be similar to that existing around reservoirs.

In the long term, some reservoirs would still become inoperative due to siltation and breaching. Wildlife program funds would be used to repair those reservoirs needed to sustain big game. Eventually, stock-watering reservoirs would become inoperative except for those maintained with wildlife program funds.

Alternative 3 (Optimize Livestock Grazing)

This alternative would generally have the same effect on wetlands as discussed for grazing treatments in the proposed action. Optimum forage utilization in wetland zones by livestock would not be met because maximum vegetation production can only be achieved when the wetland ecosystem is healthy. Construction of new reservoirs would increase waterfowl and other wildlife habitat.

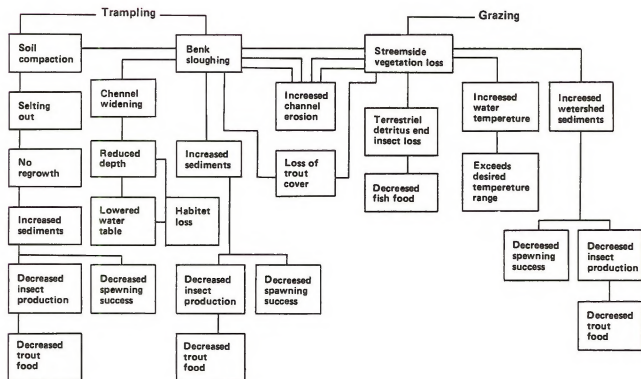
Alternative 4 (Manage for Other Grazing Uses)

Initial impact on fish and wildlife habitat in wetland zones would be similar to the no grazing option. Following restoration of channels, banks, and riparian habitat; livestock use of the wetland zone would be allowed at a rate which does not degrade the habitat. Eventually, forage utilized by livestock in restored wetland zones should exceed that presently taken.

WILDLIFE

The wildlife impact analysis was based on the following assumptions:

1. The Wyoming Game and Fish Department would manage game populations at the 1978 strategic plan levels and revisions thereof (refer to Appendix C).
2. Adverse impacts to terrestrial wildlife are defined as any environmental change which reduces wildlife populations size below the capability of the existing carrying capacity or reduces existing carrying capacity. Similarly, beneficial impacts are defined as environmental change which restores depleted or increases carrying



Modified from Armour - 1977

Figure 3-1

IMPACTS TO TROUT HABITAT FROM INTENSIVE LIVESTOCK USE OF STREAM ZONES

ENVIRONMENTAL CONSEQUENCES

capacity for the species being considered (Thompson 1977).

Proposed Action

Terrestrial

As the plant communities change the wildlife using them would also change. Displacement would occur on specific pastures and allotments as the ecological condition changes in response to vegetation manipulation and behavioral intolerances between livestock and wildlife occur.

Habitat quality and quantity would improve where livestock grazing is deferred or rested and may improve where deferred. The nonuse pastures would also provide areas where wildlife species would not have to interact physically (e.g. nest trampling, etc.), competitively (e.g. forage), and socially with livestock. Increases in forage and cover would occur in rest and may occur in deferred pastures.

Allotments and pastures having turnout dates from April through June would create wildlife/livestock interactions during one of the most crucial times for a majority of the wildlife species: reproduction (late fetal development, birth, rearing of new born and lactation). Animals recovering from winter stress would also be affected during early spring periods.

Water developments would enhance most species habitat, especially during summer months. Fenced water developments and springs would provide habitat for birds and small mammals. It also would provide an improved area of feeding for predators and raptors. Water developments on crucial wintering areas (particularly elk and antelope) deplete winter forage through the concentration of livestock and wildlife prior to the crucial period.

Plant treatments would affect localized wildlife populations, especially small mammals, reptiles and birds having small home ranges. The wildlife species inhabiting an area might change as vegetative species and composition changes.

Grazing impacts to wildlife habitats are frequently amplified by other resource activities such as energy development, timber and recreation management. Table 3-9 summarizes the anticipated impacts on wildlife.

Table 3-10 compares the estimated competitive forage and the amount of forage that would be consumed by wildlife for each alternative. Figure 3-2 compares the wildlife carrying capacities of each alternative over a 20- year period. These are relative values that represent a composite carrying ca-

capacity for big game species. Percent values are relative to the forage requirements of the G&F strategic plan population goals.

Antelope

The primary pronghorn/domestic livestock conflicts concern forage and spatial competition between antelope, cattle, sheep and horses. Range improvement projects would affect antelope; for example, antelope habitat is altered by sagebrush eradication.

Rested or deferred pastures would decrease displacement and competition with livestock and increase nutrient intakes for antelope on about 260,000 acres.

Short-term winter and spring domestic sheep use on crucial antelope winter ranges would deplete forage needed to support antelope. Areas of concern are sheep allotments in upper Fifteenmile, North Gooseberry allotment, and those sheep allotments along the eastern edge of the EIS area north of Worland. These impacts would continue to some degree in the long term where winter sheep use is concurrent with antelope winter use. Short-term declines in antelope use are probable. Antelope and sheep compete for shrubby winter forage and spring forbs.

Ripping blue grama range would increase forage plant diversity on spring, summer, and fall antelope range. Burning and sagebrush spraying would decrease antelope habitat availability. Winter ranges buffer crucial areas during mild winters and in effect leave crucial winter range for severe climatic conditions.

Deer

Deer rely on shrub and forb species for much of their diets. Forage competition exists between livestock and mule deer at certain times of the year when diets overlap. For example, the estimated dietary overlap between deer and sheep is 53 percent, and 15 percent between deer and cattle. Fences and habitat alteration disturb mule deer. New waters foster competition between livestock and mule deer. The availability of suitable water limits mule deer distribution at lower elevations east of Highway 120.

Resting and deferring pastures would reduce forage competition and increase nutritional intake on approximately 220,000 (17 percent) acres of deer habitat.

No significant change in livestock use of riparian areas and desert drainages on Fifteenmile Creek is

TABLE 3-9

SUMMARY OF LONG-TERM WILDLIFE IMPACTS OF THE PROPOSED ACTION

Qualitative Analysis ^{5/}	Treatment Combinations	Category ^{1/}	Elk	Deer	Antelope	Moose	Bighorn Sheep	Upland Game Birds
Rest Pastures	1	I	+3	+2	+2	+2	+1	+2
Use Pastures	1	I	-3	-1	-1	-1	-3	-2
Spring Rest	2	I	NA	+2	+2	NA	NA	+2
Other Use Pastures	2	I	NA	-2	-2	NA	NA	-1
Deferred Use	3	I	-1	+3	+2	-1	+1	+2
Stream Bottom Livestock Use	I,M,C		*	*	*	*	*	*
			-2	-3	-2	-3	-2	-2
Wetland Livestock Use	I,M,C		*	*	*	*	*	*
			-2	-3	-2	-3	-2	-2
Growing Season Livestock Use	M,C		*	*	*	*	*	*
			-2	-2	-2	-2	-2	-2
NonGrowing Season Livestock Use	M,C		*	*	*	*	*	*
			-2	-1	-1	-2	-3	-1
Livestock Use Adjustment	I,M,C		-2	-1	NA	-2	-2	NA
Wild Horse Adjustments	I		NA	+1	+1	NA	NA	+1
Fences ^{2/}	I,C		-1	-1	-1	-1	-1	-1
Water Developments ^{2/}	I		+1	+2	+2		+1	
			-3	-2	-2	+1	-3	+2
Ripping ^{2/}	I		NA	+1	+1	NA	NA	+1
Prescribed Burning ^{2/}	I		+2	-1	+1	+1	+1	-1
								+1

TABLE 3-9 (Cont'd)

SUMMARY OF LONG-TERM WILDLIFE IMPACTS OF THE PROPOSED ACTION

Qualitative Analysis ^{5/}	Treatment Combinations	Category ^{1/}	Elk	Deer	Antelope	Moose	Bighorn Sheep	Upland Game Birds
Rotary Cutting ^{2/}		I	NA	+1	-1	NA	NA	-1
Brush Spraying ^{2/}		I,M,C	NA *	-2 *	-3 *	-1 *	NA *	-2 *
Monitoring Lag Period		I,M,C	-1	-2	-1	-1	-2	-2
Qualitative Total			-1	-1	-1	-1	-3	-1

Quantitative Analysis	Category	Elk	Deer	Antelope	Moose	Bighorn Sheep	Upland Game Birds
Habitat Alteration (Estimated Acres)	I,M,C	199,000	1,264,000	1,043,000	46,000	31,000	1,264,000
Change in Estimated ^{4/} Carrying Capacity (%)		-17	-5	+9	-14	-67	+10

TABLE 3-9 (Cont'd)

SUMMARY OF LONG-TERM WILDLIFE IMPACTS OF THE PROPOSED ACTION

- 1/ The letters M, I, or C with each practice indicate the allotment range management categories in which this action might occur in the proposed action. These category assignments do not assess actions which may, or may not, occur in the M & C categories at the livestock operators initiative and expense.
- 2/ These evaluations address the direct impacts of the facility. They do not address the resultant indirect impacts of the facility (i.e., better livestock distribution as a result of a fence).
- 3/ Water developments are generally a benefit except where adjacent to or on crucial ranges. Such waters concentrate animals to the detriment of habitat conditions. The double (+/-) reflect this situation. Blue grouse are benefited by the proposed burns and sage grouse are negatively impacted. The double ratings (+/-) indicate sage grouse impacts/blue grouse impacts.
- 4/ These percentages represent long-term departures from the existing situation. They do not reflect the relation to the Wyoming Game and Fish Department goals. For example: Antelope carrying capacity will increase 9 percent over the current situation, but this will still be 7 percent short of the Wyoming Game and Fish Department goals.
- 5/ These relative, ordinal values deal with the ability of the habitat to fall short, maintain, or exceed Wyoming Game and Fish Department 1978 Strategic Plan (and revision) wildlife management levels (goals). Where definite management actions were unknown at this time, a "worst-case" analysis was conducted. The following symbols apply:

+ = an action that contributes toward the attainment and/or maintenance of G&F goals.

- = an action that detracts from the attainment and/or maintenance of G&F goals.

* = an action that is ongoing.

0 = and action that would not affect the G&F goals.

NA = Not Applicable (can either mean that no quantitative goals have been established, or that this practice will not occur in the habitat of a given species).

1, 2, and 3 are ordinal values referring to an impact of low, moderate, and high magnitude, respectively.

For example: -2

This action detracts from the ability to attain (or maintain) G&F goals to a moderate degree by decreasing habitat carrying capacity. This impact is presently occurring and is expected to continue.

TABLE 3-10

ESTIMATED COMPETITIVE AND CONSUMED FORAGE

	Existing Situation				Proposed Action		Alternative #1	
	Dietary* Overlap		Forage Consumed	Competitive Forage	Forage Consumed	Competitive Forage	No Change Forage Consumed	Competitive Forage
	Cattle	Sheep	(000s lbs/%)	(000s lbs/%)	(000s lbs/%)	(000s lbs/%)	(000s lbs/%)	(000s lbs/%)
	%	%						
Livestock			99,372/85#	99,372/93	86,034/80†	86/034/94	132,444/90†	132,444/96
Wild Horses	77/NA		3,237/3	2,492/2	1,080/1	828/<1	1,080/<1	831/<1
Total Wildlife			14,021/12	4,678/4	20,157/19	5,092/6	14,021/10	4,661/3
Antelope	10/10	45/40	2,451/2	582/<1	2,760/3	667/1	2,451/2	582/<1
Deer	15/12	53/29	8,361/7	2,026/2	13,473/13	2,191/2	8,361/6	2,026/1
Elk	NA/60	NA/22	2,887/2	1,994/2	3,498/3	2,161/2	2,887/2	1,994/1
Moose	NA/15	NA	276/<1	41/<1	392/<1	59/<1	276/<1	24/<1
Bighorn Sheep	NA/75	NA	46/<1	35/<1	34/<1	14/<1	46/<1	35/<1
Total			116,630/100	106,542/100	107,271/100	91,957/100	147,545/100	137,936/100

TABLE 3-10

ESTIMATED COMPETITIVE AND CONSUMED FORAGE
(Cont'd)

	Alternative #2 No Livestock (No Action) Forage Consumed Competitive (000s lbs/%) (000s lbs/%)		Alternative #3 Optimize Livestock Forage Consumed Competitive (000s lbs/%) (000s lbs/%)		Alternative #4 Manage for Other Grazing Uses Forage Consumed Competitive (000s lbs/%) (000s lbs/%)	
Livestock	0	0	113,880/91	113,880/98	92,040/81	92,040/93
Wild Horses	1,080/2	0	0	0	1,080/1	831/1
Total Wildlife	66,432/98	0	11,653/12	2,715/3	20,163/18	5,158/5
Antelope	29,455/44§	0	1,849/2	447/<1	2,760/2	667/<1
Deer	23,118/34	0	8,038/8	1,328/2	13,473/12	2,214/2
Elk	12,148/18	0	1,399/1	864/1	3,459/3	2,160/2
Moose	687/<1	0	276/<1	41/<1	392/<1	59/<1
Bighorn Sheep	1,024/1	0	46/<1	35/<1	79/<1	58/<1
Total	67,512/100	0	125,533/100	116,595/100	80,028/100	98,029/100

* Dietary overlap factors based on fecal analysis data from EIS area from 1977-1979, and literature. For example: 45/40 under antelope and sheep indicates a dietary overlap of 45% in desert habitats and a 40% dietary overlap. There is a significant difference in species diets between the lower rainfall, desert areas, and the higher rainfall, foothill and mountain areas. Wildlife forage use figures are based upon forage consumption rates supplied by the Wyoming Game & Fish Department (G&F 1979).

5-year average licensed use (1976-1980).

† Livestock figures represent "preference" use. If monitoring shows carrying capacity to be different from "preference," then it is assumed that use adjustments would be made accordingly.

\$ These figures assume no change in current distribution, which would actually occur in terms of expansion and improved forage condition to a significant, but unknown, extent.

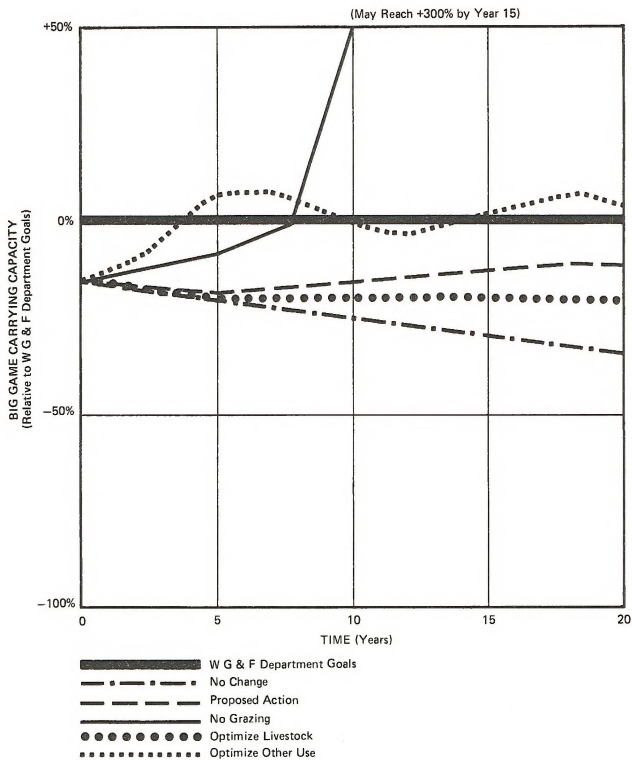


Figure 3-2
RELATIVE BIG GAME CARRYING CAPACITIES BY ALTERNATIVE

ENVIRONMENTAL CONSEQUENCES

anticipated and continued deterioration of the cottonwood/big sagebrush community is expected until these areas are protected. This would further degrade crucial deer habitat. Sheep use is particularly detrimental to carrying capacity of desert drainages for deer.

Burning would improve spring, summer, and fall but will not improve winter deer range.

Changes in ecological condition toward a climax would benefit deer as long as diversity is maintained and vigorous sagebrush communities continue to support wintering populations. As ecological conditions advance to a grassland monotype, mule deer would decrease substantially.

Wyoming Game and Fish Department (G&F) management levels for deer would not be met or maintained in the long term.

Elk

Elk compete with livestock for space and forage, particularly in that portion of the EIS area south of Enos Creek. Most winter elk ranges south of Cottonwood Creek are on scattered land ownership and are heavily used by livestock prior to winter. Habitat quality would decrease over time in ability to support present elk use south of Cottonwood Creek. The area north of Enos Creek will probably remain status quo in regard to elk use as affected by livestock.

Range management in the "M" and "C" categories would not change the current situation with elk greatly, while "I" category allotments will realize some change in the long term.

Long-term changes in ecological condition in the "I" category are expected to improve elk foraging areas by providing greater grass and forb production, but improving elk carrying capacity depends on prewinter livestock grazing levels.

Prescribed fire generally benefits elk on all seasonal ranges.

Rest pastures would benefit elk habitats by providing for forage areas without forage, social and spacial competition from livestock.

Wyoming Game and Fish Department (G&F) management levels for elk would not be met in the long term.

Bighorn Sheep

The greatest bighorn/livestock conflict probably concerns forage competition and the tendency for livestock to displace the bighorn sheep in traditional bighorn sheep range. For example, there is an

estimated 75 percent dietary overlap between bighorn sheep and cattle.

Prescribed fire would attract bighorns to spring and winter foraging areas if burn areas are not grazed by livestock before winter. Grazing treatments such as deferment or rest would allow short-term increases in habitat quality, however, bighorns do not shift from use to nonuse pastures readily, and changes in population trends would not be expected. G&F goals would not be met or maintained under the proposed action.

Moose

The primary conflict between moose and livestock concerns spatial and forage competition along stream bottoms and in aspen and deciduous shrub communities.

Resting, deferring, or protecting riparian areas from livestock use would improve the quality of moose habitat by increasing aspen, willow, maple, elderberry, and other browse production.

Prescribed burning would also increase spring and early summer moose forage and stimulate new aspen growth.

G&F management goals for moose would be met in some allotment areas, but probably not on "M" and "C" category allotments which include the major portion of moose habitat.

Game Birds

Spring period deferment, or rest, would increase nesting success for all upland game birds as well as increase survival of the young.

Since sage grouse depend on sagebrush for habitat, sagebrush eradication on both public and private lands as well as concurrent use of herbicides and insecticides on private lands in summer have significantly reduced their population.

The loss of contiguous blocks of sagebrush by spraying and the elimination of sagebrush dominated mosaics or plant communities would reduce sage grouse habitat and populations. Spraying of summer sage grouse habitats would also decrease habitat potential by decreasing broadleaf succulent forbs, decreasing habitat diversity and roosting cover. Burning sage grouse winter habitat areas would reduce sage grouse populations. Burns that increase succulent plants would increase blue grouse habitat. Rotary cutting would increase game birds' habitat mosaics.

Existing livestock/chukar/Hun conflicts occurring as a result of cover destruction, and forage compe-

ENVIRONMENTAL CONSEQUENCES

tion in riparian communities would continue in "M" and "C."

Threatened or Endangered Species

Impacts on black-footed ferrets and bald eagles from the proposed action and alternatives are currently undetermined. The consultation process with FWS is currently going on, and studies being conducted on ferrets adjacent to the EIS area should yield some insight regarding impacts on this species.

Alternative 1 (No Change in Existing Livestock Management)

Table 3-11 summarizes impacts to terrestrial wildlife with no change in existing livestock management. Continuation of present management practices would not attain Wyoming Game and Fish Department management goals for big game (Figure 3-2). The same type of impacts as addressed in the proposed action would occur in this alternative, with the only difference being magnitude. Habitat quality and quantity would continue to decrease and population levels would decline. Elk, bighorn sheep, and moose habitat conditions would probably decline further, and more rapidly, than would deer or antelope habitat since deer and antelope have a greater capacity for utilizing disclimax habitat.

Game bird average populations would decline until habitat conditions eventually stabilize.

Alternative 2 (No Livestock Grazing)

Table 3-12 summarizes impacts to wildlife by the elimination of livestock grazing. Big game habitat quantity and quality would increase significantly through expansion of wildlife ranges and improved forage availability and quality.

Although MFP levels of wildlife would be maintained, carrying capacity for Wyoming Game and Fish Department management levels would be exceeded. Carrying capacity for elk would increase up to 5 times the current strategic plan levels. Unused summer habitats would be fully utilized and winter ranges would be extended eastward into historical range for elk and migratory mule deer.

Bighorn sheep could be re-introduced and historical populations and distributions could be re-established.

The moose population would increase as riparian and deciduous shrub and tree habitat improves.

The distribution of antelope would extend into unused areas, but the population would probably not increase beyond the current strategic plan levels.

The mule deer population would likely realize an increase for a decade or two, and then slowly decline as the ecological condition advanced. Eventually, populations would stabilize.

The sage grouse population would follow a similar cycle, while other game birds would have higher population levels throughout their cyclic fluctuations.

Alternative 3 (Optimize Livestock Grazing)

Table 3-13 summarizes impacts to wildlife.

Wildlife population levels would not attain Wyoming Game and Fish Department management levels. The overall impacts would be relatively the same as the "no change" alternative, and the proposed action. However, the magnitude of the impacts and the rate of decline would be less than "no change" and greater than the proposed action. The point of stabilization would be greater than the "no change" alternative and less than the proposed action for sustainable populations of game animals.

The greatest impacts of this alternative would be suffered by sage grouse, antelope, and mule deer in sagebrush treatment areas.

Alternative 4 (Manage for Other Grazing Uses)

Wyoming Game and Fish Department strategic plan goals could be attained (Table 3-14 and Figure 3-2).

Current total wildlife demand for forage is only 62 percent of demand based on the G&F strategic plan levels. The majority of the difference is attributable to the currently depressed mule deer population. The present wildlife/livestock competitive forage demand represents only 6.5 percent of the forage that could be consumed by livestock (based on the past five year actual livestock use and present wild horse numbers). The wildlife/livestock competitive forage demand projected for G&F strategic plan management goals is only 5.7 percent of the forage that could be consumed by livestock (based upon reduction of wild horses to an average of 100, and present livestock grazing preference).

TABLE 3-11

SUMMARY OF LONG-TERM NET WILDLIFE IMPACTS OF ALTERNATIVE #1 (NO CHANGE) 1/

Qualitative Analysis	Elk	Deer	Antelope	Moose	Bighorn Sheep	Upland Game Birds
	*	*	*	*		*
Treatment Combination 1	-1	+1	+1	-1	NA	+1
		*	*			*
Treatment Combination 2	NA	+1	+1	NA	NA	+1
	*	*	*	*	*	*
Treatment Combination 3	-1	+1	+1	-1	-2	+2
	*	*	*	*	*	*
Stream Bottom Livestock Use	-3	-3	-3	-3	-3	-3
	*	*	*	*	*	*
Wetland Livestock Use	-3	-3	-3	-3	-3	-3
	*	*	*	*		*
Growing Season Livestock Use	-3	-3	-3	-3	NA	-3
	*	*	*	*	*	*
Non-Growing Season Livestock Use	-3	-2	-2	-3	-3	0
	*	*	*	*	*	*
Preference Grazing	-3	-2	-1	-3	-3	-3
		*	*			*
Wild Horse Adjustments	NA	-1	-1	NA	NA	-2
Fences	0	0	-1	0	0	0
Water Development	0	0	0	0	0	0
	*	*	*	*	*	*
Qualitative Total	-3	-2	-1	-3	-3	-2
<hr/>						
Quantitative Analysis						
Change in Estimated Carrying Capacity (%)	-40	-25	-3	-50	-100	-15

1/ See TABLE 3-9 for an explanation of the tabular notations.
Exceptions are noted below.

TABLE 3-12

SUMMARY OF LONG-TERM NET WILDLIFE IMPACTS OF ALTERNATIVE #2
(NO ACTION - NO LIVESTOCK GRAZING) ^{1/}

Qualitative Analysis	Elk	Deer	Antelope	Moose	Bighorn Sheep	Upland Game Birds
Livestock Grazing Permit Expiration	+3	+3	+3	+3	+3	+3
Wild Horse Adjustments	NA	+1	+1	NA	NA	+1
Fences	-1	-1	-1	-1	-1	-1
Qualitative Total	+3	+3	+3	+3	+3	+3
<hr/>						
Quantitative Analysis ^{2/}						
Change in Estimated Carrying Capacity (%)	+400	+275	+150	+250	+400	+100

^{1/} See TABLE 3-9 for an explanation of the tabular notations.

Exceptions are noted below.

^{2/} These are estimated values based on carrying capacity, with limits applied to account for factors other than forage (i.e., water distribution, carrying capacity of summer range on national forest lands, etc.).

TABLE 3-13

SUMMARY OF NET WILDLIFE IMPACTS OF ALTERNATIVE #3 (OPTIMIZE LIVESTOCK GRAZING) ^{1/}

Qualitative Analysis	Elk	Deer	Antelope	Moose	Bighorn Sheep	Upland Game Birds
Treatment Combination 1	0	-1	-1	-1	-1	+1
Treatment Combination 2	0	+1	+1	NA	NA	+1
Treatment Combination 3	0	+1	+1	-1	-1	+2
	*	*	*	*	*	*
Stream Bottom Livestock Use	-2	-3	-2	-3	-2	-2
	*	*	*	*	*	*
Wetland Livestock Use	-2	-2	-2	-3	-1	-2
Livestock Only Veg. Use Adj.	-3	-1	-1	-3	-3	0
Wild Horse Removal	NA	0	0	NA	NA	+1
Fences	-1	-1	-2	-1	-1	-1
Water Developments	-3	+1	-2	-1	-3	+1
Ripping	NA	+1	+1	NA	NA	+1
Prescribed Burning	+1	-2	+1	+1	+1	-1
Rotary Cutting	NA	0	-1	NA	NA	-1
Brush Spraying	NA	-3	-3	-1	NA	-3
	*	*	*	*	*	*
Monitoring Lag Period	-1	-2	-1	-1	-2	-2
Qualitative Total	-2	-1	-1	-2	-3	+1

Quantitative Analysis ^{2/}

Change in Estimated Carrying Capacity (%)	-45	-5	0	-30	-100	+15
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^{1/} See TABLE 3-9 for an explanation of the tabular notations.
Exceptions are noted below.

^{2/} These are estimated values based on carrying capacity, with limits applied to account for factors other than forage production (i.e., sage spraying of crucial sage grouse habitat, additional waters in crucial elk winter range, etc.).

TABLE 3-14

SUMMARY OF NET WILDLIFE IMPACTS OF ALTERNATIVE #4 (MANAGE FOR OTHER GRAZING USES) ^{1/}

Qualitative Analysis	Elk	Deer	Antelope	Moose	Bighorn Sheep	Upland Game Birds
Treatment Combination 1	+1	+2	+1	+1	0	+1
Treatment Combination 2	+1	+2	+1	+1	0	+1
Treatment Combination 3	+2	+3	+3	+1	+1	+2
Stream Bottom Livestock Management ^{2/}	+1	+3	+2	+3	+1	+2
Wetland Livestock Management ^{2/}	+1	+3	+3	+3	+1	+3
Application Range Suitability	+3	+3	+3	+3	+3	+1
Forage Allocation for All Uses	+2	+2	+2	+2	+1	NA
Wild Horse Adjustments	NA	+1	+1	NA	NA	+1
Fences	-1	-1	-1	-1	-1	-1
Water Developments	+1	+2	+3	+1	+1	+3
Ripping	NA	+1	+1	NA	NA	+1
Prescribed Burning	+3	+2	+1	+1	+2	+3
Rotary Cutting	NA	+1	-1	NA	NA	-1
Brush Spraying	NA	+1	+1	0	NA	0
Qualitative Total	+2	+2	+2	+2	+1	+2

Quantitative Analysis ^{2/}

Change in Estimated Carrying Capacity (%)	+7	+18	+16	+24	+51	+50
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^{1/} See TABLE 3-9 for an explanation of the tabular notations.
Exceptions are noted below.

^{2/} Figures presented here represent attainment of the difference between the current wildlife populations and the Wyoming Game and Fish Department goals.

ENVIRONMENTAL CONSEQUENCES

That represents an increase of 600 AUMs of competitive forage over the present wildlife demand.

Game birds would be impacted in the same manner as in the "I" category of the proposed action.

RECREATION

Alternatives 2 and 4 and the proposed action would improve conditions for fishing and big game hunting. Alternative 2 would increase hunting opportunities as game populations increase. Sight-seeing opportunities would be slightly enhanced from the proposed action and Alternatives 2 and 4. Recreation opportunities would not change significantly with a continuation of the existing situation (Alternative 1). A decrease in aesthetic appeal and quality recreational experiences would result from optimizing livestock grazing (Alternative 3).

Range improvements have high potential for adverse impacts on the recreation resource. Hunting, fishing and zoological sight-seeing opportunities would be improved by these water developments.

Hunting opportunities for big game and waterfowl would increase with the proposed action. Free movement for recreational activities such as off-road vehicles, hiking, horseback riding and rock hounding could be slightly impaired due to additional fencing. Fencing of riparian areas would improve stream conditions and fishing.

Improved watershed conditions would improve recreational fishing, but a slight decrease in aesthetic appeal would result from increased land/vegetative treatments and range improvements.

VISUAL RESOURCES

Alternatives 2 and 4 and the proposed action would improve visual quality through improved range conditions. No significant changes in visual resources would be noticeable if Alternative 1 is implemented. Visual quality would be adversely impacted from Alternative 3, due to degrading the natural land character.

A change in vegetative composition would change the visual variety and the form, line, color and texture elements of the landscape. Grazing treatments could create a visual contrast between grazed and rested pastures. Unesthetic results of vegetative manipulation would be temporary until vegetation is re-established, but in the long term,

aesthetics would improve as range conditions improve. Most impacts associated with implementation of grazing treatments would be minimal after VRM program procedures and constraints have been applied.

Visual quality would be degraded from any project causing surface disturbance and loss of vegetation. Fences degrade scenic quality especially along ridges and where there is a contrast between a rested pasture and one that has been grazed. Range improvements and plant treatments would affect visual resources the most.

Range improvements in the foreground and middleground of VRM Class II areas could affect scenic quality, as would visual contrast changes in the foreground of some VRM Class III areas (Table 3-15). Range improvements would not affect VRM Class IV areas.

Overall an improved vegetative condition would enhance scenic quality.

CULTURAL RESOURCES

The proposed action and alternatives have the potential to affect cultural resources. Alternatives 2 and 4 and the proposed action would maintain the cultural resource base at the present level. Damage to cultural resource sites from livestock trampling would be eliminated with Alternatives 2 and 4. No significant change in present damage rates to cultural resource sites would occur with Alternative 1. Potential for extensive surface damage and displacement to cultural resources exists with Alternative 3. Impacts would be minimized through design restraints and protection procedures for all projects (see Chapter 1, Range Improvements). National Register eligible sites would be avoided or preserved according to established review and protection procedures.

The proposed action would reduce erosion and trampling of cultural resource sites. Construction of fences (including cattleguards and corrals) and water development projects would produce some surface disturbance, from project construction and increased livestock trampling. Loss of vegetation on livestock trails and congregation areas could increase erosion and weathering. Land treatment projects could expose and destroy surface and subsurface cultural remains. Exposed artifacts would be more susceptible to amateur collecting and vandalism, as well as the natural forces of erosion and weathering.

TABLE 3-15
POTENTIAL IMPACTS ON VISUAL RESOURCE MANAGEMENT

VRM Management Class/No. Allotments Involved	Distance Zone	Sensitivity Level	Potential Impacts
Class II			
3	Foreground/Middleground	High	4 Range Improvements
1	Foreground/Middleground	High	1 Plant Treatment
5	Foreground/Middleground	Medium	14 Range Improvements
4	Foreground/Middleground	Medium	4 Plant Treatments
4	Seldom Seen	Low	4 Range Improvements
3	Seldom Seen	Low	4 Plant Treatments
Class III			
17	Foreground/Middleground	High	25 Range Improvements
11	Foreground/Middleground	High	13 Plant Treatments
27	Foreground/Middleground	Medium	36 Range Improvements
14	Foreground/Middleground	Medium	26 Plant Treatments
2	Background	High	2 Range Improvements
1	Background	High	1 Plant Treatments
1	Seldom Seen	Medium	1 Range Improvements
3	Seldom Seen	Medium/High	4 Range Improvements
2	Seldom Seen	Medium/High	3 Plant Treatments

Source: USDI, BLM, URA 1980, MFP 1981

ENVIRONMENTAL CONSEQUENCES

WILD HORSES

With the proposed action and Alternatives 1, 2 and 4, existing wild horse use would decrease from 300 head needing 3,240,000 pounds of forage to 100 head requiring 1,080,000 pounds of forage. All the wild horses would be removed from the Little Sand Draw area. Wild horses in the Fifteenmile herd area would be reduced to a management level of 100 head. The Fifteenmile wild horse historical area consists of approximately 260,000 acres, this would be reduced to approximately 70,000 acres (Table 3-16 and Figure 1-3). Restricting wild horses from their historic home range would cause short-term stress. This could result in fence damage from wild horses trying to return to their historic home ranges. The amount of fence damage would decrease in the long term as horses become accustomed to their new range but some damage would continue.

Where vegetation would be allocated to sustain MFP wild horse numbers the health of the remaining horses could improve.

Reducing the herd would increase the potential for interbreeding but recognition of the problem and implementation of proper management actions (such as introduction of new bloodlines) would minimize the effect on the horses.

The impacts of Alternative 2 would be similar to those of the proposed action but greater in magnitude since more forage would be available. An increase in the reproductive rate could require more frequent removals. While horse numbers would be maintained at MFP levels, forage would be available in the proposed horse management area allotments for up to 235 head.

Stress due to the lack of reliable winter drinking water, would be reduced with new water developments and upgrading of older projects using designs which would keep water open in winter.

LIVESTOCK GRAZING

Table 3-17 lists the forage that would be available for livestock grazing with the proposed action and alternatives and is based on the assumption that adjustments in use levels would be made, thus, causing long-term (20 years) changes in vegetative condition which would affect supply. During the past five years, average annual total use was 127,400 AUMs.

The proposed grazing management on "I" category allotments and elimination of spring use on

"C" category allotments would increase forage yield and should improve livestock conditions. Weaning weights, calf crops and cull-cow weights should increase and death loss should decrease.

Forty-eight of the 94 permittees in the Resource Area have at least one "I" category allotment. Their active grazing preference in these allotments account for an estimated average of 30 percent of their total livestock forage requirements and range from less than 5 percent to more than 50 percent. The effect of a change in livestock grazing would depend on how critical their dependence on public forage is and the amount of change.

The elimination of spring use would aggravate the already serious problem of spring range availability in the Bighorn Basin. More intensive management implies more work, e.g. more handling of stock, more facility maintenance, etc. Livestock grazing on some "I" category allotments would be changed after monitoring and consultation indicates a need. Permanent cancellation of privileges on some "C" category allotments could occur. With Alternative 2, the amount of forage consumed by livestock on federal lands would be eliminated. Affected operators would reduce their herds by an estimated average 20 percent.

With Alternative 3, increased management control and project maintenance would be required, but livestock production would increase.

With Alternative 4, livestock grazing would be reduced to allow for management of other resources. Livestock grazing in all allotments in the GCRA would be affected by this action. More management control and project maintenance would be required. In the long term, forage supply would increase and ecological condition would improve. This should improve weaning weights, calf crops, cull-cow weights and reduce death loss.

SOCIOECONOMICS

The economic analysis of the proposed action and alternatives is expressed in terms of effects on livestock forage needs, ranch valuations, ranch operation and income, annual local personal income, and annual local employment. Neither the proposed action nor the alternatives would significantly impact the local population. The livestock related income and employment impacts are based on supply of livestock forage identified in Table 3-17. The short-term impact analysis assumes the proposed action and Alternative 3 would begin after monitoring. Short-term impacts from Alternative 2 and 4 would begin after the decision; however, the

TABLE 3-16

ALLOTMENTS WITH WILD HORSES

Existing Situation	Proposed Action and Alternatives 1,2,64
<u>Fifteenmile Herd</u>	<u>Fifteenmile Herd</u>
0508	0604
0509	0652
0604	0662
0612	0669
0639	1070
0640	
0652	
0662	
0669	
1070	
<u>Sand Draw Herd</u>	
0503	
0538	
0590	

TABLE 3-17

LEVEL OF LIVESTOCK FORAGE USE (AUMs)^{1/}

	Proposed Action	ALTERNATIVES			
		1	2	3	4
Short Term ^{2/}					
Public Lands	54,300	81,300	0	54,300	54,300
State Lands	6,800	9,700	9,700	6,800	6,800
Private Lands	23,700	36,400	36,400	23,700	23,700
Total	84,800	127,400	46,100	84,800	84,800
Long Term					
Public Lands	70,600	81,300	0	93,400	75,500
State Lands	8,800	9,700	9,700	11,700	9,400
Private Lands	30,900	36,400	36,400	40,900	33,100
Total	110,300	127,400	46,100	146,000	118,000

^{1/} Based on estimated existing forage, or projected forage, on inventoried lands, plus 15,300 AUMs of forage on uninventoried land.

^{2/} Assumes impacts of proposed action and Alternative 3 would begin after the monitoring period stated in the Chapter 3 assumption. Impacts from Alternatives 2 and 4 would begin after the decision. However, the level identified for Alternative 2 may not occur until 1989.

ENVIRONMENTAL CONSEQUENCES

impacts identified for Alternative 2 may not occur until 1989.

Effect on Ranch Valuations

Generally, a change in a base property's public grazing privileges would change its total appraised value, depending on the ranch operation's interdependence between public and private lands.

Ranch valuations in the Bighorn Basin might initially be reduced as much as \$5.1 million (85,000 AUMs x \$60/AUM for the proposed action and Alternatives 3 and 4). Alternative 2 could reduce ranch valuations by \$7.4 million. We assume forage production would gradually increase with the proposed action and Alternatives 3 and 4. Thus, in the long term, ranch valuations would be reduced \$3.6 million, \$1.4 million, and \$3.1 million, respectively, for the proposed action and Alternatives 3 and 4.

Effect on Ranch Operations

The impacts on ranch operations and income would depend largely on the operator's management response but even a relatively small reduction in public grazing would probably involve changing his average herd size. For example, a 10 percent reduction in rangeland forage supplies would cause about a 5 percent decrease in animal units (AUs). Refer to Appendix I for expected changes in representative herd sizes that correspond to adjustments in available rangeland forage.

Appendix I shows the estimated effects adjusting rangeland forage supplies on "returns above cash costs" on representative sized livestock operations.

Effects on Income

Appendix I displays the estimated effects to representative operations, from adjustments in rangeland forage supplies. Table 3-18 displays the estimated personal income impacts to the Bighorn Basin economy.

Some industrial sectors of the local economy would be affected more than others. For example, reducing total livestock production would most dramatically affect the following sectors: alfalfa and hay, trucking, trade, finance, insurance, real estate, local government, and households (Lewis and Taylor, 1977).

Changes in local income related to recreation expenditures would be insignificant and would not offset changes related to those in the livestock industry, e.g., income would change by less than \$20,000 with each alternative except Alternative 2 which could increase income by about \$80,000.

Expenditures for range improvements would be spread over a 10-year construction period. Estimated total expenditures for range improvements would be \$2.5 million, \$3.1 million, and \$2.8 million for the proposed action, Alternative 3, and Alternative 4, respectively. Total annual local income related to constructing range improvements would be about \$80,000, \$100,000 and \$90,000 for the proposal, Alternative 3, and Alternative 4 respectively.

Effects on Employment

Table 3-19 shows the livestock related employment effects of each alternative. None of the alternatives would cause more than a half of a percent change in total employment in the Bighorn Basin.

Expenditures for range improvements would increase construction related employment by about 10 FTEs for the proposed action and Alternatives 3 and 4. As recreation activities and expenditures increase with Alternative 2, recreation related employment could increase by about 20 FTEs.

EFFECTS ON SOCIAL ATTITUDES

Locally, the proposed action (the proposed rangeland management policy) would be seen as another instance of decision making by government officials who fail to understand the effects on local range users. This would intensify negative attitudes toward the federal government and contribute to an already existing alienation and frustration with government. The BLM may be blamed for causing economic impacts to ranchers that are inevitable but unrelated to the proposed action. For example, a rancher may have to reduce the size of his operation because high interest rates do not allow him to borrow enough money to maintain his operation even before the proposed action is adopted.

Accepting Alternative 2 would cause extensive local reaction and would be considered an extreme example of decision making by government officials who fail to understand or care about the well-being of local range users. Individuals, businesses, and organizations would publicly oppose this action.

TABLE 3-18
ESTMATED LIVESTOCK RELATED INCOME

	5 Year Average Total Use	Proposed Action	Alt. 1	Alt. 2	Alt. 3	Alt. 4
<u>SHORT TERM:</u>						
Direct Income (Bighorn Basin) (\$ thousands) ^{1/}	610	310	610	130	310	310
Total Income Bighorn Basin ^{2/} (\$ thousands)	1,570	800	1,570	340	800	800
<u>LONG TERM:</u>						
Direct Income (Bighorn Basin) (\$ thousands) ^{1/}	610	530	610	130	760	570
Total Income Bighorn Basin ^{2/} (\$ thousands)	1,570	1,370	1,570	340	1,960	1,470

^{1/} Average return above cash costs per AUM x number of AUMs.

^{2/} Based on a livestock industry income multiplier of 2.58.

TABLE 3-19
ESTIMATED LOCAL LIVESTOCK RELATED EMPLOYMENT

	5 Year Average Total Use	Proposed Action	Alt. 1	Alt. 2	Alt. 3	Alt. 4
<u>SHORT TERM:</u>						
Direct Employment in Livestock Sector ^{1/} (FTE)	60	40	60	20	40	40
Total Livestock Related Employment ^{2/} (FTE)	90	60	90	30	60	60
<u>LONG TERM:</u>						
Direct Employment in Livestock Sector ^{1/} (FTE)	60	50	60	20	60	50
Total Livestock Related Employment ^{2/} (FTE)	90	80	90	30	110	80

^{1/} A change of 190 Animal Units (AUs) would cause a 1 FTE change in livestock industry employment (Lewis and Taylor, 1977)

^{2/} Based on a livestock industry employment multiplier of 1.64

ENVIRONMENTAL CONSEQUENCES

Alternative 3 would generally be perceived as being responsive to local range users economic welfare. Adverse reaction would be expected from environmentalists, recreationists, and wildlife interests.

Local range users would be even less supportive of Alternative 4 than of the proposed action. This would be perceived as another example of BLM having told local range users one thing during the planning process while explaining the proposed range land management policy and adopting something else (i.e., Alternative 4) without considering the concerns of local range users. Individuals, businesses and livestock organizations may also publicly oppose Alternative 4, while environmentalists, recreationists, and wildlife interests would generally support this action.

RECOMMENDED MITIGATION

The proposed action was developed through the land use planning process which consists of what BLM management considers the conflict resolution that is best suited to the situation. Therefore, mitigating measures which would be recommended have already been included in the proposed action.

UNAVOIDABLE ADVERSE IMPACTS

The mitigating measures presented in this EIS have been incorporated into the descriptions of the proposed action and alternatives. Therefore, assuming no additional mitigating measures would be taken, the environmental consequences described in this chapter must be considered "unavoidable" for each particular management option.

SHORT-TERM USE VERSUS LONG-TERM PRODUCTIVITY

In the short term, livestock numbers and management would remain the same, and the impacts

which are presently occurring would continue. The BLM's commitment to making stocking levels commensurate with carrying capacity, in the long term, would result in improved range condition. A range-land in improved condition will produce more livestock forage by slowing runoff thus protecting the watershed and water quality. This will also provide for more diversity of uses. Better condition range-land is generally considered to be in a more climax ecological stage and tends to have more grasses than forbs or shrubs in its plant composition. This translates into less carrying capacity for deer, antelope, and moose but more capacity for elk, bighorn sheep and livestock. Under these conditions calf weaning weights would be greater and livestock animal condition would improve lowering unit operating cost for ranchers.

The impacts of the proposed action or alternatives to all resources may be amplified by activities in the GCRA such as energy development, timber and recreation. The magnitude of these cumulative impacts is difficult to determine because of the unquantified level of these future activities.

IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF RESOURCES

Although some changes caused by the proposed action and alternatives would be difficult to restore or reverse in the short term, most impacts would be reversible in the long term. However, in implementing the proposed action or an alternative, certain resources would be committed and would not be retrievable in the foreseeable future. The anticipated irretrievable commitments for the proposed action and/or one or more of the alternatives would include: (1) money, materials, fuel, and energy expended in management of livestock grazing and construction of range improvements; (2) loss of soil and productivity on localized areas because of livestock concentrations; (3) water and forage consumed by livestock or wildlife; (4) cultural resources damaged or destroyed; and (5) livestock production, income, and associated economic benefits lost or foregone.

CHAPTER 4

CONSULTATION AND COORDINATION

PUBLIC PARTICIPATION

The following is a summary of the involvement opportunities given to the public and government agencies during the land use planning process (the basis for the proposed action) as well as during EIS scoping and preparation:

- In July, 1976 a Preplanning Analysis was begun as well as a plan for public participation. District advisory board, county commissioners and key individuals were contacted to identify issues.
- From 1976 through 1980, BLM resource specialists contacted individuals and interest groups to explain the planning process and gain information. BLM contacted city, county and state government, other federal agencies and congressional delegations to keep them informed of progress and seek input on recommendations. During this period, a number of releases to local news media were made as well as appearances by BLM on local radio "talk shows" explaining the BLM's planning process and inviting input.
- During the same period of 1977-1980, the BLM conducted intensive inventories including SVIM. Several workshops were held during this period to explain the inventory process to local ranchers and other interested parties.
- During and following the SVIM inventory process, individual ranchers were consulted by BLM about problems and opportunities in their allotments, updating of allotment files and determining grazing suitability. Input was solicited at each of these meetings for the land use plan as a whole as well as individual allotments. All but a few operators were contacted, some of them several times.
- In June 1981, the Notice of Intent to prepare an EIS was published in the Federal Register.
- In July 1981, the BLM issued a proposed rangeland management policy and it was determined that the Grass Creek EIS would be prepared under this policy. A series of public meetings were held throughout the Basin to explain the new policy and acquire public input into the development of criteria needed to categorize allotments. The multiple use advisory council

was also contacted. Local realty and financial institutions were contacted individually to explain the new policy.

- After allotments were categorized, livestock operators were contacted to discuss individual allotments. County governments and Wyoming Game and Fish were kept informed during this process.
- In August and September 1981, the BLM Multiple Use Advisory Council was involved in the conflict resolution portion of land use planning as were several interest groups and key individuals.
- In September, a public meeting was held to discuss proposed multiple use recommendations. This was followed by a series of "open houses" for the same purpose and the EIS scoping meeting was held.
- Consultation with U.S. Fish and Wildlife Service regarding threatened and endangered species is taking place.

Throughout the planning and EIS process numerous items of information and comments were received from agencies, organizations and individuals. This information was evaluated and used and the written information is being kept in a file at the Worland District Office.

EIS REVIEW

A news release will be issued statewide announcing its availability. A minimum of two months will be provided for public review. Substantive comments received on the draft will be printed with responses in the final EIS.

Rangeland Program Summary

No sooner than 30 days and no later than five months following the publication of the final EIS, a Rangeland Program Summary would be published summarizing the land use planning objectives for all rangeland and proposed grazing decisions affecting

CONSULTATION AND COORDINATION

livestock grazing. This summary will be distributed to all the parties on the EIS mailing list.

The EIS will be sent to the following agencies, organizations, and individuals.

Elected Federal Officials

Senator Malcolm Wallop
Senator Alan Simpson
Congressman Dick Cheney

Elected State Officials

Governor Ed Herschler
State Senators Jerry Geis, Cal Taggart and Robert Frisby
State Representatives Dave Asay, Mark Sorensen, Grant Sanders and Stanford Smith

Federal Agencies

Economics Statistics Service
Forest Service
Soil Conservation Service
Agricultural Stabilization and Conservation Service
Resource Conservation and Development Coordinator
Fish and Wildlife Service
National Park Service
Geological Survey
Bureau of Reclamation
Environmental Protection Agency
Advisory Council on Historic Preservation

State of Wyoming Agencies

Department of Agriculture
Environmental Quality
Land Commissioners (Land Office and Farm Loan)
Game and Fish Department

Soil Conservation Districts

Washakie
Park

Bighorn and Hot Springs

County Commissioners

Washakie
Park
Hot Springs
Big Horn

County Extension Agents

Washakie
Park
Hot Springs
Big Horn

Planning and Zoning Commissions

Park
Hot Springs
Big Horn
Washakie

City Mayors

Thermopolis
Worland
Basin
Meeteetse
Greybull

Organizations

Natural Resource Defense Council, Inc.
Sierra Club
The Nature Conservancy
Public Lands Council
University of Wyoming
Hot Springs Rod and Gun
Wild Horses of America
Wyoming Wool Growers
Wyoming Livestock Assn.
Big Horn Basin Wildlife Club
Society for Range Management

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National Audubon Society
Federal Land Bank
Production Credit Assn.
The Wilderness Society
American Fisheries Society
The Wildlife Society
Trout Unlimited
The Izaak Walton League of America
Defenders of Wildlife

District Advisory Council (11 Members)

District Grazing Advisory Board (7 Members)

Grazing Operators (94 in Grass Creek Resource Area)

Other Individuals, Local Libraries, News Media, Financial Institutions (Approximately 75 on mailing list)

LIST OF PREPARERS

In compliance with Section 1502.17 of Title 40 Code of Federal Regulations, the names and qualifications of the persons primarily responsible for preparing this EIS are listed in Table 4-1.

TABLE 4-1

LIST OF PREPARERS

Name	EIS Responsibility	Education	Professional Experience
John E. Moorhouse	Team Leader	BS Forest Management	10 yrs. Forester - Bureau of Indian Affairs 3 yrs. Forester/Fire Control - BLM 2 yrs. Environ. Coord. - BLM 2 yrs. Chief, Div. of Planning & Environ. Coord. - BLM
John H. Thompson	Environ. Coord./ Socio-Economics	BS Political Science BS Economics MS Agricultural Economics	3 yrs. Economist - BLM 2 yrs. Environmental Coord. - BLM
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Jeffrey W. Denton	Terrestrial Wildlife	BS & MS Wildlife Management	2 yrs. Biologist - State Game & Fish 2 yrs. Range Conservationist - BLM 5 yrs. Wildlife Biologist - BLM
Richard L. Kroger	Wetlands/Fishery	BS Wildlife Sciences MS Zoology (Fisheries)	7 yrs. Research Biologist - Nat. Marine Fisheries Service 5 yrs. Biologist - U.S. Fish & Wildlife Service 3 yrs. Biologist - BLM
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Gary B. McFadden	Wild Horses	BS Range Management	6 yrs. Range Conservationist - BLM
James R. Darlington	Vegetation	BS Range Management	2 yrs. Range Conservationist
Dallas E. Heller	Livestock Grazing	BS Range Management BS Wildlife Management	3 yrs. Natural Resource Specialist - BLM 3 yrs. Range Conservationist - BLM

TABLE 4-1

LIST OF PREPARERS
(Cont'd)

Name	EIS Responsibility	Education	Professional Experience
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Robert L. Barry	Recreation/ Wilderness	BS Psychology MS Forest Recreation	6 yrs. Recreation Planner - BLM
Paul J. Meyer	Soils	BS Biology MS Botany	3 yrs. Soil Scientist - BLM 1 yr. Forestry Tech. - USFS
Gary W. Rosenlieb	Water Resources	BS Microbiology MS Water Resources	2 yrs. University Water Planning 3 yrs. Hydrologist - BLM
John H. Jameson	Cultural Resources	BS Biology MA Anthropology	2 yrs. Archeologist/Planner - California 3 yrs. Archeologist - BLM
Lorri S. Denton	Typist		
Peggy A. Sommers	Typist		
Theresa E. Bihr	Typist		



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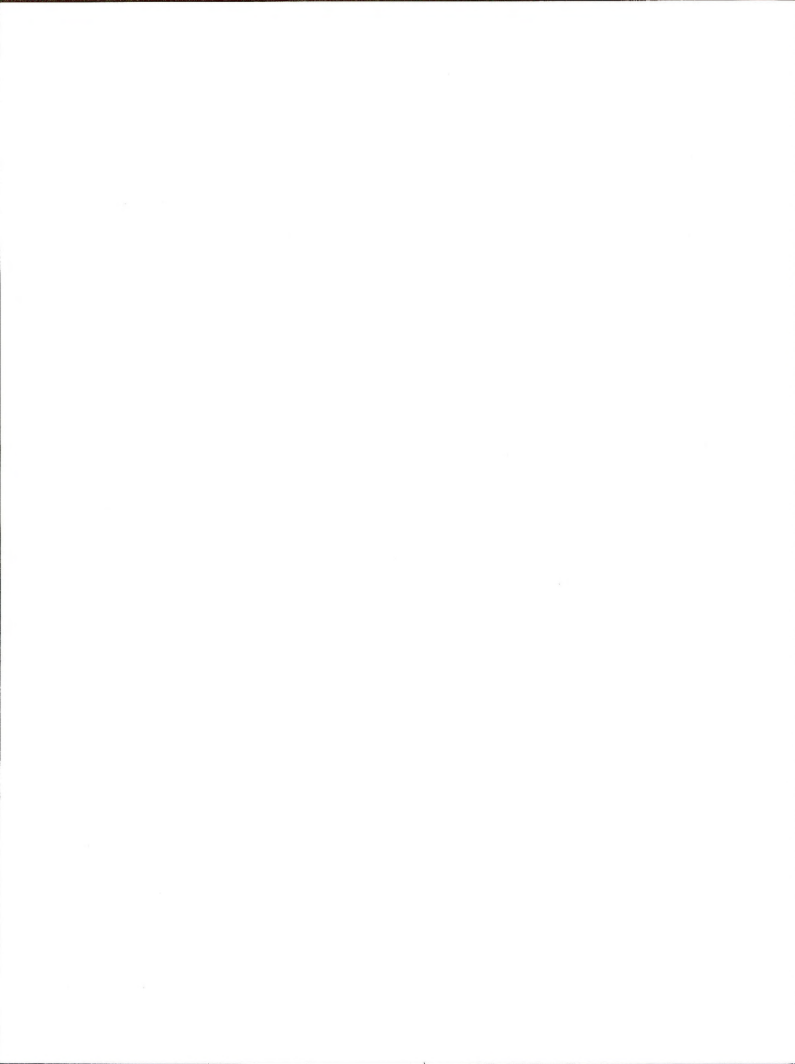
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GLOSSARY

- ACRE FOOT** - A unit of volume of water equal to the volume of a prism one foot high with a base one acre in area, 43,560 cubic feet, or 325,851 gallons.
- APPARENT TREND** - An estimate of the trend of range condition based on a one-time observation of site characteristics.
- AUM** - An acronym for Animal Unit Month, the amount of forage needed to sustain one animal unit (one cow or its equivalent) for one month. In this document one AUM is 780 pounds of air-dry forage.
- AVAILABLE WATER CAPACITY (A.W.C.)** - Moisture holding capacity of the soil. In this report, it refers to the water available for plant uptake, in the soil profile.
- BEHAVIORAL INTERACTION (SOCIAL INTERACTION)** - The psychological and behavioral tolerance (or intolerance) of one species for another as the opportunity occurs for interaction. This may vary with phase of life cycle.
- BLUE GRAMA RIPPING** - The use of machinery to tear open the persistent blue grama (*Bouteloua gracilis*) sod that develops from repeated spring grazing. The ripping, along with possible seeding and protection from early grazing, is intended to re-establish the more desirable forage species that have been selectively grazed out of the plant community.
- CANID** - Short form for any animal that is a member of the family Canidae.
- CARRYING CAPACITY** - A variously defined term, usually intended to mean the maximum level of grazing use that can be sustained without damage to the range.
- CFS** - Abbreviation for cubic foot per second.
- CONSTRUCTION LIMITS** - Characteristics of the soil that impose limitations on construction projects such as buildings or water containment structures.
- COVER** - The material covering the soil and providing protection from, or resistance to, the impact of raindrops and the energy of overland flow, and expressed in percent of the area covered. Composed of vegetation, litter, small rock, and large rocks.
- CRITICAL HABITAT** - Any air, land, or water area (exclusive of those existing man-made structures or settlements which are not necessary to the survival and recovery of a listed threatened or endangered species) and constituent elements thereof, the loss of which would appreciably decrease the likelihood of the survival and recovery of a listed species or a distinct segment of its population.
- CRUCIAL HABITAT** - Include parts of the habitat which are necessary to sustain the existence and/or perpetuation of a wildlife species at critical periods during its life cycle or those factors needed to maintain a healthy wildlife population in their normal life cycle, e.g., antelope kidding grounds, fish spawning areas, prairie chicken booming grounds, sage grouse strutting grounds, sharptail grouse dancing areas, etc.
- CYCLOC** - Referring to the sequential highs and lows in animal populations (i.e., cottontail rabbits, etc.).
- DEFERRED ROTATION** - A system of grazing use in which the delayed initiation of grazing use is systematically rotated among the various subdivisions of the range unit. It differs from rest rotation in that the entire range unit is used at some time during the grazing season.
- DEFERRED USE** - The delay of livestock grazing for a specified time during the growing season to allow the desirable forage species to reach a growth stage more capable of tolerating grazing.
- DIETARY OVERLAP** - The degree, in percent, to which the diets of different species of animals overlap in terms of food items used and the relative amounts of these food items in their respective diets.
- DISCLIMAX** - A successional stage created and maintained by disturbance, usually by man or his animals.
- DISPLACEMENT** - The population redistribution resulting from disturbance, or other environmental change. As used here, displacement could be a range extension, or expansion, or an avoidance of an otherwise suitable area due to habitat alteration or social intolerance.
- DIVERSITY** - The relative degree of abundance of wildlife species, plant species, communities, habitats, or habitat features per unit of area.
- ECOLOGICAL CONDITION** - The existing state of the vegetation on a site compared to the natural potential (climax) plant community for that site. It is used interchangeably with "range condition" and describes the deviation from the climax condition according to four arbitrary condition classes. Not synonymous with "forage condition" which does not relate to site potential.
- ECONOMICALLY IMPORTANT SPECIES** - Those species of animal which have a significant consumptive value (i.e., big game, etc.) or yield some direct monetary return (i.e., furbearers, etc.).
- ELECTRICAL CONDUCTIVITY (E.C.)** - Measurement of the electrical conductivity of dissolved salts (salinity) in the soil. High conductivity shows high salt concentrations. 640 times the electrical conductivity gives parts per million salt.
- ENDANGERED SPECIES** - As referred to in the Endangered Species Act of 1973, any species of plants or animals which are in danger of extinction throughout all or a significant portion of its range.
- EROSION** - The wearing away of the land surface by running water, wind, ice, or other geologic agents including such processes as gravitational creep, detachment and movement of soil or rock by water, wind, ice, or gravity.
- EROSION HAZARD "K"** - Measurement of the inherent erodibility hazard of the soil. The higher the K value, the higher the erosion hazard.
- FECAL COLIFORM** - Bacteria that are present in the intestine and feces of warm-blooded animals. Their presence in water indicates fecal contamination.
- FORAGE ALLOCATION** - The purposeful, documented, distribution of available forages for each and all uses (i.e., water-

GLOSSARY

- shed, non-game and game wildlife, wild horses, domestic livestock, and basic plant vigor).
- FU** - An acronym for Forage Unit, used in place of AUM in this document to avoid the ambiguities that might occur by using the term AUM when dealing with several species of animals.
- GRAZING FORMULA** - The arrangement of grazing treatments to be applied under a grazing system.
- GRAZING SYSTEM** - The manipulation of the grazing use on an area in a particular pattern, to achieve specific objectives.
- GRAZING TREATMENT** - The particular configuration of grazing use and rest experienced by a given range unit during a year under a grazing system.
- HABITAT MOSAIC** - Refers to the juxtaposition of all possible plant communities relative to one another, giving an appearance of irregular sizes and shapes. Sometimes referred to as habitat diversity.
- HERD UNIT** - Pertains to the geographic area used by one relatively distinct population of big game animals. As used herein, this is analogous to the Wyoming Game & Fish Department's data analysis units (DAUs).
- HYDROLOGIC GROUP** - Measure of the runoff hazard from the soil. Four groups exist, A through D. A has the lowest runoff hazard and D has the highest runoff hazard.
- IMPORTANT HABITAT** - Those parts of a species habitat which are necessary to sustain the existence and/or perpetuation of a healthy wildlife species population in their normal life cycle (i.e., general elk winter range is important, whereas, winter range used during severe conditions is crucial).
- KEY SPECIES** - Forage species of particular importance in the plant community or which are important because of their value as indicators of change in the community.
- NONGAME AND OTHERS** - As used in this document, refers to the following species or groups of species: raptors, furbearers, predators, small game, nongame mammals and birds, reptiles, and amphibians.
- NORMAL PRODUCTIVITY** - Under usual climatic conditions, the quantity by weight of annual forage growth the soil will support.
- pH** - Negative log of the hydrogen ion activity. Below pH7, hydrogen ion activity makes the soil acid, above pH7, hydroxyl ion activity makes the soil alkaline.
- PHENOLOGY** - The study of recurring natural phenomena, such as blossoming, and their relation to season and climate.
- PRESCRIBED BURNING** - The purposeful use of fire on a predetermined area to make some intended change in the plant community, usually promoting herbaceous growth at the expense of woody species.
- RANGE IMPROVEMENT** - A structure or land treatment intended to facilitate the management of range or livestock on the range, e.g. reservoirs, fences, sage sprayings, etc.
- RANGE SITE** - A distinctive kind of rangeland that differs from other kinds in productivity, soil depth, or surface texture by its ability to produce a characteristic plant community unique in the kind or proportion of species.
- RECREATION DAY** - One person engaged in a recreational activity for any part of a day.
- REST ROTATION** - A prescribed pattern of grazing use which sequentially rests various parts of the range unit for at least an entire year. It counters the deleterious effects of selective grazing by allowing the grazed plants to recover vigor, produce seed and establish new plants.
- RIPARIAN** - Situated on or pertaining to the bank of a watercourse or body of water or other wet area. Usually refers to the plant community of such an area.
- ROTARY BRUSH CUTTING** - The use of a tractor-mounted rotary mower to cut down particularly dense stands of brush.
- RUNOFF** - Water which travels over the soil surface to the nearest stream channel.
- SAGEBRUSH SPRAYING** - The application of herbicides to control sagebrush that has come to make up an inordinate amount of the plant community.
- SEASONAL USE AREAS** - Include areas which are normally used and can be separated by seasons of the year, such as winter, summer, yearlong, etc.
- SEDIMENT YIELD** - At a given point within a watershed or for a specific area is the amount of eroded material accumulated or passing through that given point or area. Sediment yield data are recorded on Forms 7310-14. (See Illustration 1.)
- SOIL LOSS TOLERANCE "T"** - Allowable loss in tons per acre of soil from the surface horizon. Within the accepted limits, the soil will renew itself. If limits are expected, the soil resource will be depleted.
- STRESS** - Any stimulus, as fear or pain, that disturbs or interferes with the normal physiological equilibrium of an organism. The physical, mental, or emotional strain or tension (i.e., excessive energy loss by wildlife due to frequent human disturbance).
- SUBCLIMAX** - Any successional stage preceding ecological climax.
- SURFACE PERMEABILITY** - The measure of a soil's ability to pass water through its pore spaces, measured in inches per hour. Larger pores, such as those found in sandy textured soils, pass water faster than fine textured soils with very small pores.
- SUSPENDED SEDIMENT** - Very fine soil particles which remain in suspension in water for a considerable period of time without contact with the bottom.
- SVIM** - Soil Vegetation Inventory Method -- A prescribed method of inventorying soil and vegetation.
- THREATENED SPECIES** - As referred to in the Endangered Species Act of 1973, any species which is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range.
- TREND** - The direction of change in the condition or health of the range, usually gauged in relation to its natural potential, and determined by observation over a period of time.

GLOSSARY

USABLE FORAGE - The proportion of total plant production that may be consumed by animals without causing damage to the plants.

UTILIZATION - The proportion of the current year's forage production that is removed by grazing or browsing animals. It may refer to particular species or to the entire plant community and is usually expressed as a percentage.

APPENDIX A

ESTIMATED FORAGE SUPPLY AND DEMAND

A1 Estimated Supply of Forage Available to Livestock, Wildlife and Wild Horses

A2 Estimated Demand for Forage by Livestock, Wildlife and Wild Horses for Each Alternative Habitat Condition Classification

APPENDIX A

TABLE A1

ESTIMATED SUPPLY OF FORAGE AVAILABLE
TO LIVESTOCK, WILDLIFE AND WILD HORSES
(1,000 Pounds)

Allotment Number	Grasses	Total Vegetation ^{1/} Forbs	Shrubs	Total Production	Total Usable Vegetation ^{2/}
0504	2,274	966	3,211	6,451	904
0506	301	101	259	661	89
0507	6,262	5,475	9,402	21,139	2,186
0508	12,829	6,459	20,573	39,861	5,169
0509	3,998	5,462	13,990	23,450	2,560
0510	2,647	425	1,852	4,924	779
0512	1,842	375	1,678	3,895	598
0513	182	114	50	346	57
0515	258	262	863	1,383 ^{3/}	103
0516	1,496	1,140	3,393	6,029	505
0519	349	222	704	1,275	104
0521	975	492	2,073	3,540	448
0522	2,310	553	2,315	5,178	638
0523	1,453	500	898	2,851	425
0524	581	439	578	1,598	190
0525	674	1,110	1,218	3,002	285
0526	1,075	112	462	1,649	282
0527	149	20	118	287	39
0528	248	209	618	1,075	122
0529	3,272	856	1,347	5,475	889
0530	906	236	966	2,108	348
0531	607	209	211	1,027	157
0532	313	119	555	987	92
0533	404	106	171	681	115
0534	1,745	342	1,254	3,341	557
0535	3,334	1,610	2,633	7,577	992
0536	683	81	142	906	141
0537	1,118	256	994	2,368	309
0538	464	224	847	1,535	207
0539	63	229	1,033	1,325	176
0540	404	185	347	936	104
0541	233	226	996	1,455	84
0542	439	825	467	1,731	180
0543	142	249	349	740	56
0544	3	11	25	39	3
0545	1,501	811	1,555	3,867	386
0546	224	66	248	538	66
0548	157	355	109	621	45
0549	38	68	38	144	14
0551	1,352	171	296	1,819	296
0552	553	172	1,747	2,472	150
0553	2,412	484	923	3,819	631
0554	246	136	832	1,214	143

APPENDIX A

TABLE A1

ESTIMATED SUPPLY OF FORAGE AVAILABLE
TO LIVESTOCK, WILDLIFE AND WILD HORSES
(1,000 Pounds)
(Cont'd)

Allotment Number	Grasses	Total Vegetation ^{1/} Forbs	Shrubs	Total Production	Total Usable Vegetation ^{2/}
0556	591	245	305	1,141	162
0557	63	31	51	145	19
0558	461	156	362	979	122
0559	231	1,029	1,376	2,636	263
0560	163	213	703	1,079	73
0561	1,105	454	1,027	2,586	324
0564	2,036	88	310	2,434	611
0566	387	161	729	1,277	104
0567	450	348	478	1,276	161
0568	3,657	5,111	14,368	23,136	1,272
0569	7,330	3,036	2,511	12,877	1,973
0572	1,008	205	210	1,423	265
0573	1,203	498	837	2,538	367
0574	1,520	1,087	1,683	4,290	482
0575	543	500	2,143	3,186	246
0576	222	799	935	1,956	123
0577	301	858	1,720	2,879	271
0578	284	1,161	848	2,293	205
0579	3,167	2,123	3,440	8,730	1,057
0580	311	200	278	789	104
0582	691	114	167	972	161
0585	352	88	92	532	92
0586	209	45	59	313	46
0588	66	168	147	381	27
0590/					
0503	1,060	779	830	2,669	357
0593	117	36	70	223	43
0594	1,018	154	780	1,952	278
0595	370	272	336	978	141
0596	1,792	625	1,627	4,044	694
0597	1,158	1,108	1,435	3,701	394
0604	14,203	2,762	10,663	27,628	3,642
0605	15,564	4,736	14,884	35,184	4,229
0606	14,541	6,944	46,815	68,300	4,168
0607	1,846	1,083	955	3,884	648
0608	625	112	217	954	163
0609	986	548	8,995	10,529	675
0610	170	148	244	562	63
0612	258	101	949	1,308	152
0613	1,146	201	355	1,702	268
0614	388	270	463	1,121	116

APPENDIX A

TABLE A1

ESTIMATED SUPPLY OF FORAGE AVAILABLE
TO LIVESTOCK, WILDLIFE AND WILD HORSES
(1,000 Pounds)
(Cont'd)

Allotment Number	Grasses	Total Vegetation ^{1/} Forbs	Shrubs	Total Production	Total Usable Vegetation ^{2/}
0615	384	797	739	1,920	191
0616	781	169	654	1,604	224
0617	48	9	3	60	11
0618	159	30	45	234	43
0619	362	1,686	2,796	4,844	343
0620	2,013	976	586	3,575	525
0621	633	250	506	1,389	200
0622	1,369	232	1,614	3,215	399
0623	678	136	1,930	2,744	344
0626	660	929	1,265	2,854	300
0627	1,674	545	1,611	3,830	538
0628	693	328	1,220	2,241	230
0633	3,298	1,045	9,857	14,200	915
0634	3,157	1,294	2,582	7,033	1,107
0635	327	285	1,092	1,704	127
0636	66	13	263	342	78
0637	2,469	935	693	4,097	674
0638	1,091	368	1,143	2,602	350
0639	1,615	970	2,215	4,800	655
0640	1,712	486	1,971	4,169	584
0641	232	56	148	436	78
0642	3,840	1,232	3,397	8,469	1,152
0643	978	457	1,571	3,006	359
0644	2,140	821	1,448	4,409	675
0645	1,946	457	831	3,234	474
0646	30	9	15	54	632
0647	391	267	498	1,156	104
0648	110	57	210	377	56
0650	455	276	507	1,238	125
0651	1,409	4,626	9,739	15,774	1,939
0652	4,298	946	3,257	8,501	1,292
0653	364	90	194	648	110
0654	568	187	305	1,060	152
0657	383	194	209	786	111
0661	4,364	2,512	5,449	12,325	1,308
0662	3,982	1,446	3,735	9,163	1,329
0663	1,349	203	623	2,175	1,354
0664	35	63	147	245	24
0665	2,966	1,339	2,165	6,470	706
0668	226	638	1,421	2,285	158
0669	732	1,184	3,329	5,245	620
0671	1,903	2,627	7,324	11,854	1,403
0672	730	391	1,835	2,956	213

APPENDIX A

TABLE A1
ESTIMATED SUPPLY OF FORAGE AVAILABLE
TO LIVESTOCK, WILDLIFE AND WILD HORSES
(1,000 Pounds)
(Cont'd)

Allotment Number	Grasses	Total Vegetation ^{1/} Forbs	Shrubs	Total Production	Total Usable Vegetation ^{2/}
0674	686	602	1,343	2,631	322
0678	3,457	1,182	2,500	7,139	950
0679	345	80	379	804	112
0681	1,722	991	3,805	6,518	566
0704	193	58	218	469	183
0705	198	193	180	571	-
1070	338	817	1,830	2,985	299
1071	1,413	90	798	2,301	444
1077	1	8	22	31	4
2501	684	116	49	849	185
2510	772	155	731	1,658	249
2518	432	98	129	659	-
2538	1,301	202	166	1,669	373
2555	1,186	277	841	2,304	357
3033	500	170	594	1,264	-
TOTALS	211,962	107,660	301,465	621,087	72,441

^{1/} Inventoried pounds including tree growth to 4.5 feet, annuals, grasses and forbs, shrubs, and cactus.

^{2/} Pounds of forage available for livestock, wildlife, and wild horses with proper use of perennial species.

^{3/} Only small portion of allotment inventoried.

APPENDIX A

TABLE A2
ESTIMATED DEMAND FOR FORAGE BY
LIVESTOCK, WILDLIFE, WILD HORSES, FOR EACH ALTERNATIVE
(1,000 Pounds Forage on Public, Private, State Lands)

Allotments	Proposed	CATEGORY M			
		Alt. 1	Alt. 2	Alt. 3.	Alt. 4
0515 Livestock	4,293	4,293		4,293	4,218
Wildlife	1,054	942	1,054/3,590	1,054	1,054
Wild Horses					
0519 Livestock	348	348		348	44
Wildlife	80	76	80/96	80	80
Wild Horses					
0520 Livestock	393	393		393	393
Wildlife	11	7	11/45	11	11
Wild Horses					
0523 Livestock	570	570		570	226
Wildlife	85	75	85/251	85	85
Wild Horses					
0530 Livestock	600	600		600	173
Wildlife	171	128	171/257	171	171
Wild Horses					
0532 Livestock	186	186		186	57
Wildlife	42	33	42/81	42	42
Wild Horses					
0534 Livestock	565	565		565	335
Wildlife	50	45	50/326	50	50
Wild Horses					
0535 Livestock	1,294	1,294		1,294	626
Wildlife	220	173	220/723	220	220
Wild Horses					
0536 Livestock	343	343		343	73
Wildlife	27	20	27/90	27	27
Wild Horses					
0540 Livestock	265	265		265	67
Wildlife	32	28	32/126	32	32
Wild Horses					
0551 Livestock	416	416		416	169
Wildlife	71	53	71/133	71	71
Wild Horses					
0552 Livestock	225	225		225	120
Wildlife	75	62	75/134	75	75
Wild Horses					
0553 Livestock	729	729		729	491
Wildlife	127	96	127/330	127	127
Wild Horses					
0564 Livestock	438	438		438	577
Wildlife	36	29	36/146	36	36
Wild Horses					
0569 Livestock	2,119	2,119		2,119	1,381
Wildlife	385	241	385/1,471	385	385
Wild Horses					
0572/ Livestock	521	521		521	315
2518 Wildlife	49	38	49/161	49	49
Wild Horses					
0574 Livestock	890	890		890	408
Wildlife	16	14	16/391	16	16
Wild Horses					
0582 Livestock	246	246		246	95
Wildlife	44	33	44/70	44	44
Wild Horses					
0584/ Livestock	467	467		467	65
0585 Wildlife	230	178	230/921	230	230
Wild Horses					
0586 Livestock	104	104		104	24
Wildlife	29	21	29/29	29	29
Wild Horses					
0587 Livestock	135	135		135	135
Wildlife	37	28	37/130	37	37
Wild Horses					
0593 Livestock	127	127		127	19
Wildlife	30	24,	30/30	30	30,
Wild Horses					

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TABLE A2
ESTIMATED DEMAND FOR FORAGE BY
LIVESTOCK, WILDLIFE, WILD HORSES, FOR EACH ALTERNATIVE
(1,000 Pounds Forage on Public, Private, State Lands)
(Cont'd)

Allotments		CATEGORY M				
		Proposed	Alt. 1	Alt. 2	Alt. 3.	Alt. 4
0594	Livestock	442	442		442	170
	Wildlife	103	83	103/210	103	103
	Wild Horses					
0595	Livestock	333	333		333	68
	Wildlife	75	65	75/132	75	75
	Wild Horses					
0599	Livestock	2,220	2,220		2,220	2,052
	Wildlife	372	328	372/1,183	372	372
	Wild Horses					
0600	Livestock	1,170	1,170		1,170	1,170
	Wildlife	181	169	181/616	181	181
	Wild Horses					
0601	Livestock	630	630		630	630
	Wildlife	111	102	111/349	111	111
	Wild Horses					
0604	Livestock	5,148	5,148		5,148	2,761
	Wildlife	368	328	368/1,163	368	368
	Wild Horses	215	215	215/844		215
0613	Livestock	425	425		425	195
	Wildlife	95	71	95/160	95	95
	Wild Horses					
0616	Livestock	365	365		365	112
	Wildlife	35	35	35/140	35	35
	Wild Horses					
0617	Livestock	8	8		7	7
	Wildlife	0	0	0	0	0
	Wild Horses					
0630/	Livestock	684	684		684	667
2533	Wildlife	230	230	230/880	230	230
	Wild Horses					
0638	Livestock	481	481		481	290
	Wildlife	30	28	30/222	30	30
	Wild Horses					
0643	Livestock	485	485		485	300
	Wildlife	67	59	67/337	67	67
	Wild Horses					
0644	Livestock	720	720		720	449
	Wildlife	38	31	38/773	38	38
	Wild Horses					
0645	Livestock	627	627		627	411
	Wildlife	47	43	47/246	47	47
	Wild Horses					
0646	Livestock	680	680		680	411
	Wildlife	38	29	38/343	38	38
	Wild Horses					
0647	Livestock	393	393		393	64
	Wildlife	19	18	19/124	19	19
	Wild Horses					
0650	Livestock	141	141		141	103
	Wildlife	20	18	20/113	20	20
	Wild Horses					
0657	Livestock	130	130		130	93
	Wildlife	18	16	18/59	18	18
	Wild Horses					
0661	Livestock	3,136	3,136		3,136	764
	Wildlife	703	581	703/1,241	703	703
	Wild Horses					
0663	Livestock	554	554		554	314
	Wildlife	25	24	25/204	25	25
	Wild Horses					

APPENDIX A

TABLE A2
ESTIMATED DEMAND FOR FORAGE BY
LIVESTOCK, WILDLIFE, WILD HORSES, FOR EACH ALTERNATIVE
(1,000 Pounds Forage on Public, Private, State Lands)
(Cont'd)

Allotments		CATEGORY M				
		Proposed	Alt. 1	Alt. 2	Alt. 3.	Alt. 4
0665	Livestock	709	709		709	426
	Wildlife	134	121	134/938	134	134
	Wild Horses					
0670	Livestock	875	875		875	109
	Wildlife	30	28	30/938	30	30
	Wild Horses					
0672	Livestock	943	943		943	131
	Wildlife	101	94	101/199	101	101
	Wild Horses					
0679	Livestock	170	170		170	67
	Wildlife	24	19	24/74	24	24
	Wild Horses					
0680	Livestock	733	733		733	59
	Wildlife	418	336	418/1,310	418	418
	Wild Horses					
2501	Livestock	125	125		125	150
	Wildlife	19	14	19/54	19	19
	Wild Horses					
2511	Livestock	99	99		99	99
	Wildlife	13	12	13/76	13	13
	Wild Horses					
2522	Livestock	20	20		20	20
	Wildlife	20	15	20/88	20	20
	Wild Horses					
2538	Livestock	156	156		156	338
	Wildlife	20	20	20/88	20	20
	Wild Horses					
2540	Livestock	48	48		48	48
	Wildlife	19	14	19/39	19	19
	Wild Horses					
2551	Livestock	12	12		12	12
	Wildlife	31	29	31/200	31	31
	Wild Horses					
2555	Livestock	89	89		89	250
	Wildlife	121	87	121/173	121	121
	Wild Horses					
2562	Livestock	102	102		102	102
	Wildlife	41	40	41/197	41	41
	Wild Horses					
2563	Livestock	60	60		60	60
	Wildlife	48	44	48/194	48	48
	Wild Horses					
3033	Livestock	62	62		62	23
	Wildlife	39	34	39/108	39	39
	Wild Horses					
3035	Livestock	66	66		66	66
	Wildlife	39	34	39/294	39	39
	Wild Horses					
"M"						
Total	Livestock	38,315	38,315		38,315	23,003
	Wildlife	6,593	5,543	6,593/23,005	6,593	6,593
	Wild Horses	215	215	215/844		215

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TABLE A2
ESTIMATED DEMAND FOR FORAGE BY
LIVESTOCK, WILDLIFE, WILD HORSES, FOR EACH ALTERNATIVE
(1,000 Pounds Forage on Public, Private, State Lands)
(Cont'd)

Allotments		Proposed	CATEGORY I			
			Alt. 1	Alt. 2	Alt. 3.	Alt. 4
0503/	Livestock	524	524		524	238
0590	Wildlife	34	30	34/172	34	34
	Wild Horses					
0507	Livestock	3,846	3,846		3,846	2,252
	Wildlife	266	259	266/2,052	266	266
	Wild Horses					
0508	Livestock	7,310	7,310		7,310	4,310
	Wildlife	776	736	776/2,867	776	776
	Wild Horses					
0509	Livestock	5,977	5,977		5,977	1,864
	Wildlife	252	245	252/1,806	252	252
	Wild Horses					
0510/	Livestock	827	827		827	623
2508/	Wildlife	141	140	141/478	141	141
3091	Wild Horses					
0516	Livestock	700	700		700	258
	Wildlife	332	271	332/560	332	332
	Wild Horses					
0522	Livestock	974	974		974	438
	Wildlife	40	38	40/540	40	40
	Wild Horses					
0524	Livestock	514	514		514	109
	Wildlife	77	64	77/229	77	77
	Wild Horses					
0525	Livestock	645	645		645	157
	Wildlife	94	79	94/393	94	94
	Wild Horses					
0526	Livestock	1,245	1,245		1,245	237
	Wildlife	41	40	41/169	41	41
	Wild Horses					
0529	Livestock	1,459	1,459		1,459	719
	Wildlife	151	114	151/463	151	151
	Wild Horses					
0531	Livestock	230	230		230	120
	Wildlife	31	26	31/76	31	31
	Wild Horses					
0537	Livestock	802	802		802	125
	Wildlife	60	47	60/239	60	60
	Wild Horses					
0538	Livestock	162	162		162	181
	Wildlife	17	16	17/93	17	17
	Wild Horses			0/125		
0541	Livestock	93	93		93	20
	Wildlife	85	77	85/86	85	85
	Wild Horses					
0542	Livestock	312	312		312	71
	Wildlife	116	96	116/216	116	116
	Wild Horses					
0545	Livestock	908	908		908	284
	Wildlife	50	36	50/379	50	50
	Wild Horses					
0556	Livestock	312	372		312	121
	Wildlife	41	31	41/110	41	41
	Wild Horses					
0558	Livestock	240	240		240	82
	Wildlife	90	78	90/117	90	90
	Wild Horses					
0560	Livestock	127	127		127	7
	Wildlife	73	57	73/146	73	73
	Wild Horses					
0568	Livestock	2,226	2,226		2,226	663
	Wildlife	244	176	244/1,899	244	224
	Wild Horses					
0573	Livestock	731	731		731	265
	Wildlife	97	77	97/257	97	97
	Wild Horses					

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TABLE A2
ESTIMATED DEMAND FOR FORAGE BY
LIVESTOCK, WILDLIFE, WILD HORSES, FOR EACH ALTERNATIVE
(1,000 Pounds Forage on Public, Private, State Lands)
(Cont'd)

Allotments	Proposed	CATEGORY I			
		Alt. 1	Alt. 2	Alt. 3.	Alt. 4
0575 Livestock	632	632		632	93
Wildlife	75	64	75/346	75	75
Wild Horses					
0579 Livestock	1,713	1,713		1,806	825
Wildlife	105	103	105/914	105	105
Wild Horses					
0596 Livestock	1,671	1,671		1,671	352
Wildlife	325	244	325/492	325	325
Wild Horses					
0605/ Livestock	6,020	6,020		6,020	3,556
2526 Wildlife	616	493	616/2,752	616	616
Wild Horses					
0606 Livestock	9,718	9,718		9,718	3,315
Wildlife	537	453	537/3,963	537	537
Wild Horses					
0607 Livestock	1,063	1,063		1,063	394
Wildlife	247	188	247/502	247	247
Wild Horses					
0609 Livestock	708	708		708	167
Wildlife	109	77	109/712	109	109
Wild Horses					
0614 Livestock	235	235		235	82
Wildlife	30	25	30/150	30	30
Wild Horses					
0615 Livestock	830	830		830	92
Wildlife	110	95	110/222	110	110
Wild Horses					
0620 Livestock	1,387	1,387		1,387	340
Wildlife	202	160	202/301	202	202
Wild Horses					
0622 Livestock	1,026	1,026		1,026	307
Wildlife	59	57	59/388	59	59
Wild Horses					
0626 Livestock	624	624		624	212
Wildlife	94	89	94/147	94	94
Wild Horses					
0627 Livestock	975	975		975	260
Wildlife	120	107	120/489	120	120
Wild Horses					
0628 Livestock	501	501		501	100
Wildlife	45	42	45/223	45	45
Wild Horses					
0633 Livestock	1,936	1,936		1,936	691
Wildlife	204	159	204/1,088	204	204
Wild Horses					
0634 Livestock	1,613	1,613		1,613	687
Wildlife	270	201	270/757	270	270
Wild Horses					
0635 Livestock	182	182		182	42
Wildlife	156	132	156/146	156	156
Wild Horses					
0637 Livestock	1,585	1,585		1,585	515
Wildlife	98	74	98/288	98	98
Wild Horses					
0639 Livestock	2,194	2,194		2,194	411
Wildlife	261	262	261/346	261	261
Wild Horses			0/241		

APPENDIX A

TABLE A2

ESTIMATED DEMAND FOR FORAGE BY
LIVESTOCK, WILDLIFE, WILD HORSES, FOR EACH ALTERNATIVE
(1,000 Pounds Forage on Public, Private, State Lands)
(Cont'd)

Allotments	Proposed	CATEGORY I			
		Alt. 1	Alt. 2	Alt. 3.	Alt. 4
0640/ Livestock	730	730		730	339
2537 Wildlife	232	229	232/289	232	232
Wild Horses			0/259		
0642/ Livestock	1,950	1,950		1,950	798
2539 Wildlife	159	120	159/559	159	159
Wild Horses					
0652 Livestock	2,659	2,659		2,659	526
Wildlife	150	138	150/635	150	150
Wild Horses	538	538	538/695		538
0662 Livestock	2,482	2,482		2,482	936
Wildlife	187	178	187/565	187	187
Wild Horses	182	182	182/492		182
0669 Livestock	1,218	1,218		1,218	379
Wildlife	31	29	31/282	31	31
Wild Horses	107	107	107/346		107
0671 Livestock	1,315	1,315		1,315	1,122
Wildlife	117	143	117/1,083	117	117
Wild Horses					
0678 Livestock	1,832	1,832		1,832	645
Wildlife	123	92	123/617	123	123
Wild Horses					
0681 Livestock	475	475		475	153
Wildlife	252	200	252/561	252	252
Wild Horses					
1070 Livestock	1,203	1,203		1,203	74
Wildlife	112	105	112/142	112	112
Wild Horses	151	151	151/169		151
1071 Livestock	1,080	1,080		1,080	283
Wildlife	99	98	99/252	99	99
Wild Horses					
2510 Livestock	270	270		270	152
Wildlife	56	46	56/196	56	56
Wild Horses					
"I"					
Total Livestock	80,084	80,084		80,084	30,992
Wildlife	8,289	7,136	8,289/32,754	8,289	8,289
Wild Horses	978	978	978/3,094		978

APPENDIX A

TABLE A2
ESTIMATED DEMAND FOR FORAGE BY
LIVESTOCK, WILDLIFE, WILD HORSES, FOR EACH ALTERNATIVE
(1,000 Pounds Forage on Public, Private, State Lands)
(Cont'd)

Allotments		Proposed	CATEGORY C1			
			Alt. 1	Alt. 2	Alt. 3.	Alt. 4
0063	Livestock	8	8		8	
	Wildlife	14	12	14/	14	14
	Wild Horses					
0504	Livestock	680	680		680	697
	Wildlife	144	131	144/681	144	144
	Wild Horses					
0506	Livestock	81	81		81	73.
	Wildlife	14	11	14/66	14	14
	Wild Horses					
0512	Livestock	566	566		566	391
	Wildlife	101	87	101/440	101	101
	Wild Horses					
0521	Livestock	368	368		368	71
	Wildlife	73	62	73/425	73	73
	Wild Horses					
0527/	Livestock	189	189		189	25
3103	Wildlife	15	14	15/24	15	15
	Wild Horses					
0533	Livestock	136	136		136	73
	Wildlife	37	23	37/62	37	37
	Wild Horses					
0539	Livestock	100	100		100	57
	Wildlife	44	27	44/156	44	44
	Wild Horses					
0543	Livestock	51	51		51	25
	Wildlife	27	21	27/66	27	27
	Wild Horses					
0546	Livestock	83	83		83	53
	Wildlife	5	5	5/52	5	5
	Wild Horses					
0548	Livestock	134	134		134	29
	Wildlife	7	7	7/20	7	7
	Wild Horses					
0554	Livestock	125	125		125	92
	Wildlife	35	32	35/93	35	35
	Wild Horses					
0559	Livestock	322	322		322	134
	Wildlife	122	114	122/205	122	122
	Wild Horses					
0561	Livestock	496	496		496	290
	Wildlife	24	22	24/283	24	24
	Wild Horses					
0566	Livestock	191	191		191	81
	Wildlife	16	16	16/204	16	16
	Wild Horses					
0567	Livestock	201	201		201	122
	Wildlife	17	14	17/81	17	17
	Wild Horses					
0576	Livestock	675	675		675	25
	Wildlife	33	29	33/151	33	33
	Wild Horses					
0577	Livestock	741	741		741	142
	Wildlife	157	149	157/218	157	157
	Wild Horses					
0578	Livestock	273	273		273	152
	Wildlife	39	38	39/122	39	39
	Wild Horses					
0580	Livestock	173	173		173	58
	Wildlife	31	23	31/83	31	31
	Wild Horses					
0588	Livestock	70	70		70	5
	Wildlife	23	22	23/26	23	23
	Wild Horses					
0597	Livestock	832	832		832	202
	Wildlife	109	83	109/538	109	109
	Wild Horses					

APPENDIX A

TABLE A2

ESTIMATED DEMAND FOR FORAGE BY
LIVESTOCK, WILDLIFE, WILD HORSES, FOR EACH ALTERNATIVE
(1,000 Pounds Forage on Public, Private, State Lands)
(Cont'd)

Allotments	Proposed	CATEGORY C1			
		Alt. 1	Alt. 2	Alt. 3.	Alt. 4
0608 Livestock	150	150		150	92
Wildlife	43	33	43/90	43	43
Wild Horses					
0610 Livestock	119	119		119	38
Wildlife	17	16	17/64	17	17
Wild Horses					
0612 Livestock	297	297		297	68
Wildlife	14	7	14/86	14	14
Wild Horses					
0619 Livestock	1,199	1,199		1,199	6
Wildlife	93	88	93/347	93	93
Wild Horses					
0623 Livestock	506	506		506	333
Wildlife	45	43	45/210	45	45
Wild Horses					
0636 Livestock	138	138		138	14
Wildlife	8,	6	8/71	8	8
Wild Horses					
0641 Livestock	87	87		87	60
Wildlife	22	19	22/48	22	22
Wild Horses					
0648 Livestock	84	84		84	19
Wildlife	11	9	11/46	11	11
Wild Horses					
0651 Livestock	2,172	2,172		2,172	1,538
Wildlife	96	91	96/1,225	96	96
Wild Horses					
0653 Livestock	95	95		95	102
Wildlife	14	11	14/52	14	14
Wild Horses					
0654 Livestock	97	97		97	102
Wildlife	29	23	29/123	29	29
Wild Horses					
0664 Livestock	19	19		19	4
Wildlife	23	21	23/22	23	23
Wild Horses					
0674 Livestock	851	851		851	68
Wildlife	69	69	69/211	69	69
Wild Horses					
"C 1"					
Total Livestock	12,309	12,309		12,309	5,241
Wildlife	1,571	1,378	1,571/6,591	1,590	1,571
Wild Horses	--	--	--	--	--

APPENDIX A

TABLE A2

ESTIMATED DEMAND FOR FORAGE BY
LIVESTOCK, WILDLIFE, WILD HORSES, FOR EACH ALTERNATIVE
(1,000 Pounds Forage on Public, Private, State Lands)
(Cont'd)

Allotments	Proposed	CATEGORY C ₂			
		Alt. 1	Alt. 2	Alt. 3.	Alt. 4
0513 Livestock	62	62		62	42
Wildlife	5	5	4/21	5	5
Wild Horses					
0528 Livestock				104	95
Wildlife	104	104	36/97	36	36
Wild Horses					
0544 Livestock	10	10		10	
Wildlife	5	5	5/5	5	5
Wild Horses					
0549 Livestock	21	21		21	
Wildlife	15	14	15/14	15	15
Wild Horses					
0557 Livestock	18	18		18	9
Wildlife	8	6	8/12	8	8
Wild Horses					
0583 Livestock	39	39		39	39
Wildlife	4	4	4/7	4	4
Wild Horses					
0611 Livestock	5	5		5	5
Wildlife	7	7	7/14	7	7
Wild Horses					
0618/ Livestock	205	205		205	35
2527 Wildlife	19	19	19/20	19	19
Wild Horses					
0629/ Livestock	42	42		42	42
2534 Wildlife	49	49	49/169	49	49
Wild Horses					
0631 Livestock				19	19
Wildlife	19	19	10/49	10	10
Wild Horses					
0668 Livestock	393	393		393	30
Wildlife	59	57	59/169	59	59
Wild Horses					
1065 Livestock	14	14		14	11
Wildlife	4	4	4/7	4	4
Wild Horses					
1077 Livestock	3	3		3	4
Wildlife	5	4	5/1	5	5
Wild Horses					
"C 2"					
Total Livestock	935	935		935	351
Wildlife	226	217	226/585	226	226
Wild Horses	---	---	---	---	---
"H" Livestock	38,315	38,315	0	38,315	23,003
Wildlife	6,593	5,543	6,593/23,005	6,593	6,593
Wild Horses	215	215	215/844	0	215
"I" Livestock	80,084	80,084	0	80,084	30,992
Wildlife	8,289	7,136	8,258/32,754	8,289	8,289
Wild Horses	978	865	978/3,094	0	978
"C 1" Livestock	12,309	12,309	0	12,309	5,241
Wildlife	1,571	1,378	1,571/6,591	1,571	1,571
Wild Horses	0	0	0	0	0
"C 2" Livestock	935	935	0	935	351
Wildlife	226	217	226/585	226	226
Wild Horses	0	0	0	0	0
TOTAL Livestock	131,643	131,643	0	131,643	59,587
Wildlife	16,679	14,274	16,679/62,935	16,679	16,679
Wild Horses	1,193	1,080	1,193/3,989	0	1,195

APPENDIX A

TABLE A2

ESTIMATED DEMAND FOR FORAGE BY
LIVESTOCK, WILDLIFE, WILD HORSES, FOR EACH ALTERNATIVE
(1,000 Pounds Forage on Public, Private, State Lands)
(Cont'd)

METHODOLOGY

(Origin of Figures in Demand Table for the
Proposed Action and the Various Alternatives)

	Proposed Action	No Action	No Livestock	Optimized Livestock	Other Use Management
Livestock	Total Demand Active Preference Plus State and Private AUM's	Total Demand Active Preference Plus State and Private AUM's	--	Total Demand Active Preference Plus State and Private AUM's	Livestock Numbers from MFP (Allocation) Run
Wildlife	MFP Numbers (G&F Strategic Goal)	Present Numbers 1980	MFP Numbers/ Numbers possible with no livestock. Antelope restrained to MFP Numbers x 10	MFP Numbers	MFP Numbers
Wild Horses	MFP Numbers	MFP Numbers	MFP Numbers/ Numbers Possible with no Live- stock on allot- ments that now have horses	--	MFP Numbers



APPENDIX B

LIVESTOCK GRAZING SUMMARY

B1 Livestock Grazing Summary — Category M

B2 Livestock Grazing Summary — Category I

B3 Livestock Grazing Summary — Category C

TABLE B1
LIVESTOCK GRAZING SUMMARY - CATEGORY H

Allotment Number	Allotment Name	ACRES				AIM's						
		Federal	State	Private	Total	Federal		State	Private	3/ Total Demand	4/ Livestock Class	Historical Season of Use
						1/ Active Preference	2/ Average 5- Yr. License					
0515	Upper Gooseberry	3,317	3,135	8,379	14,831	868	853	1,252	3,384	5,504	C	6/16 - 9/30
0519	Middle Creek	530	0	1,350	1,880	126	125	0	321	447	C	6/1-6/30;10/1-10/16
0520	Red Creek	85	0	1,987	2,072	21	21	0	483	504	C	7/1 - 7/31
0523	Highway 5/	5,691	240	232	6,163	663	664	30	38	731	C	5/6-7/5;10/12-12/16
0530	Grass Creek Basin	2,084	520	1,801	4,405	337	315	80	353	770	C	6/3 - 11/6
0532	Whiskey Gulch	320	0	640	960	79	76	0	160	239	C	7/14 - 10/22
0534	East Cottonwood	3,396	640	2,780	6,816	340	269	80	305	725	H	7/1 - 9/30
0535	West Cottonwood	7,322	640	6,171	14,133	810	497	80	770	1,660	C	2/1 - 3/15
0536	Heifer	920	320	760	2,000	225	210	64	152	441	C	11/1 - 1/31
0540	Bridges	920	0	880	1,800	190	156	0	150	340	C	5/10-5/24; 7/1-9/30
0551	Owlee - Mill Iron	2,726	0	165	2,891	493	360	0	41	534	C	5/1-6/8; 12/28-1/30
0552	Milk Creek	387	0	604	991	108	104	0	181	289	C	6/16 - 7/27
											H	6/1 - 11/30
0553	Richmond	3,829	0	2,207	6,036	599	597	0	336	935	H	11/1 - 2/28
0564	Little Buffalo Basin	2,370	0	0	2,370	562	561	0	0	562	C	8/10 - 12/01
0569	Curtis	3,600	1,280	8,278	13,158	560	558	238	1,919	2,717	C	3/1 - 9/30
												10/16 - 12/31
0572 + (2518)	Individual	2,080	0	933	4,053	180	177	0	228	668	C	5/11 - 11/30
		1,040				260	260		0			
0574	Coal Draw	6,945	40	1,057	8,042	924	771	8	210	1,142	C	11/1 - 2/6
0582	Mill Iron - East	533	480	520	1,533	66	68	120	130	316	C	5/11-6/8;11/3-11/13
0584	Jones Flat	120	0	1,680	1,800	9	9	0	384	393	C	No designated season
0585	North Hart	541	0	640	1,181	78	75	0	128	206	C	No designated season
0586	South Hart	70	0	662	732	9	9	0	125	134	C	No designated season
0587	Tyber Pasture	364	0	957	1,321	30	30	0	144	174	C	No designated season
0593	Hamilton Rim	600	0	1,560	2,160	60	60	0	104	164	H	11/1 - 2/28

TABLE B1

LIVESTOCK GRAZING SUMMARY - CATEGORY M
(Cont'd)

		ACRES				ADM's							
Allotment Number	Allotment Name	Federal	State	Private	Total	Federal		State	Private	3/ Total Demand	4/ Livestock Class	Historical Season of Use	
						1/ Active Preference	2/ Average 5- Yr. License						
0594	Buffalo Basin	2,120	55	1,200	3,375	389	377	12	166	567	C	5/8 - 8/6	
0595	Iron Creek	1,364	440	0	1,804	410	410	0	17	427	C	8/7 - 10/29	
0599	Gooseberry	2,728	1,266	9,120	13,114	513	513	212	2,080	2,867	C	3/1-6/15; 11/16-2/28	
0600	Elk Creek	1,066	0	1,935	3,001	533	533	0	968	1,501	C	6/16 - 11/15	
0601	Mormon Creek	320	0	2,030	2,350	107	107	0	701	808	C	6/16 - 11/15	
0604	Winter Area	46,401	2,627	7,164	56,192	5,312	3,774	212	1,076	6,600	C	12/16 - 3/31	
0613	Putney Flat	840	640	720	2,200	145	136	160	240	545	C	11/14 - 4/30	
0616	Home2/	3,742	590	0	4,332	378	283	90	0	468	C	4/20-5/19; 11/16-2/13	
0617	Gloyd Individual	110	0	0	110	10	10	0	0	10	C	4/20-5/19; 11/16-2/13	
0630 + (2533)	Iron Creek (Section 15)	80 160	0 —	3,350 —	20 3,590	20 19	20 0	0 —	838 —	878	C	No designated season	
0638	Individual	4,480	460	0	5,120	289	289	98	0	617	C	12/01 - 3/17	
0643	Buchanan	3,273	240	528	4,041	545	543	26	52	623	C	11/01 - 12/21	
0644	Tanner	4,916	480	2,040	7,436	600	606	62	262	924	C	12/22 - 2/28	
0645	Coal Draw	4,525	935	965	6,425	545	545	140	119	804	C	11/01 - 2/28	
0646	Back of RimSteer	6,090	640	1,040	7,770	635	635	80	157	872	C	11/01 - 2/28	
0647	South Gebo Common	2,144	0	680	2,824	340	340	0	165	505	C	11/01 - 2/28	
0650	West Allotment	2,000	0	0	2,000	181	164	0	0	181	C	9/01 - 11/15	
0657	3 Peaks Anchor	1,000	640	26	1,666	90	90	57	20	167	C	9/01 - 11/15	
0661		5,558	0	10,008	15,566	721	761	0	3,300	4,021	C	6/08 - 10/22	
0663	Cow Pasture	1,243	640	2,370	4,253	211	163	114	386	711	C	1/01 - 12/31	
0665	Nelson	13,749	320	260	14,329	861	817	23	26	910	C	4/20 - 10/10	
0670	Upper Fifteemile	1,996	640	3,515	6,151	201	140	142	780	1,123	C	9/16 - 4/15	
0672	Mountain	920	0	1,773	2,693	427	426	0	783	1,210	C	3/01 - 4/30	
0679	Horse Pasture	950	160	380	1,490	136	118	18	64	218	C	6/26 - 10/04	
											H	10/01 - 11/30	
											H	1/01 - 12/31	
0680	Lake Creek Pasture	609	720	4,770	6,099	76	76	113	752	941	C	No designated season	

TABLE B1
LIVESTOCK GRAZING SUMMARY - CATEGORY M
(Cont'd)

		ACRES				AIM's								
Allotment Number	Allotment Name	Federal	State	Private	Total	Federal			Private	3/ Total Demand	4/ Livestock Class	Historical Season of Use		
						1/ Active Preference	2/ Average 5- Yr. License	State						
0720	Putney Place	465	0	1,145	1,610	109	109	0	252	361		No designated season		
0721	Urvin Homestead	120	0	460	580	25	25	0	93	118		No designated season		
0722	Wales Homestead	120	0	560	680	24	24	0	108	132		No designated season		
2501	Section 15	514	0	0	514	161	161	0	0	161	C	11/01 - 2/28		
2511	Section 15	566	0	0	566	127	127	0	0	127	C	10/01 - 2/28		
2522	Section 15	80	0	0	80	26	26	0	0	26	C	No designated season		
2538	Section 15	1,818	0	0	1,818	200	200	0	0	200	C	6/01 - 9/30		
2540	Section 15	440	0	0	440	62	62	0	0	62	C	No designated season		
2551	Section 15	80	0	0	80	16	16	0	0	16	C	5/16 - 10/15		
2555	Section 15	1,067	0	0	1,067	115	115	0	0	115	C	No designated season		
2562	Section 15	920	0	0	920	131	131	0	0	131	C & S	5/15 - 11/14		
2563	Section 15	518	0	0	518	78	78	0	0	78	C	No designated season		
3033	Section 15	760	0	0	760	80	80	0	0	80	C	5/01 - 12/31		
3035	Section 15	509	0	0	509	85	85	0	0	85	C	No designated season		
TOTAL FOR "M" CATEGORY		170,151	18,528	100,722	289,401	22,803	19,959	3,511	23,451	49,765				

1/ Total number of animal unit months (AUMs) of livestock grazing on public lands apportioned and attached to base property owned or controlled by a permittee or lessee

2/ Five year average notice licensed AUMs of livestock grazing on public land (1976-1980)

3/ Total AUMs which can be authorized for livestock on public, state, and private land within the allotments

4/ C - Cattle

S - Sheep

H - Domestic Horses

5/ Allotments which are presently covered by an allotment management plan

+ Indicates allotments are combined

TABLE B2

LIVESTOCK GRAZING SUMMARY - CATEGORY I

Allotment Number	Allotment Name	ACRES				AIM's						Historical Season of Use
		Federal	State	Private	Total	Federal		State	Private	3/ Total Demand	4/ Livestock Class	
						1/ Active Preference	2/ Average 5- Yr. License					
0503 +	Cottonwood Common	3,885	640	0		412		64	0		C	6/16 - 10/22
0590	Sand Draw	2,481	0	0	7,006	196	353	0	0	672	C	6/16 - 9/20
0507	South Gooseberry Group	58,773	3,376	697	62,846	4,526	3,420	271	135	4,932	C	4/16 - 11/15
											S	4/01 - 4/26
0508	North Gooseberry Group	114,387	6,124	4,216	124,727	8,519	5,160	491	363	9,373	C	4/16 - 1/21
											S	11/1 - 9/15
0509	New Burlington Group ^{5/}	91,787	2,543	1,873	96,203	7,264	3,055	212	187	7,663	C	5/01 - 10/31
											S	5/05-6/20;10/10-2/19
0510 +	Fernandez Blu-Jay ^{5/}	10,009	196	1,717		698		25	200			
2508 +	Section 15	681	0	0		66		0	0			
3091	Section 15	809	0	0	13,412	72	662	0	0	1,061	C	5/16 - 10/15
0516	Cottonwood	1,125	0	2,376	3,501	203	86	0	695	898	C	6/16 - 9/30
0522	Grass Creek ^{5/}	8,932	1,123	1,100	11,155	949	560	176	124	1,249	C	4/25 - 6/19
											C	9/01 - 10/15
0524	Cottonwood	1,098	640	694	2,432	285	285	144	231	660	C	5/25-6/24;10/1-11/30
0525	Rock Creek	1,600	640	2,200	4,440	240	179	64	524	828	C	6/15 - 9/13
0526	Sand Springs	3,142	719	448	4,310	1,305	787	180	112	1,597	C	6/01 - 9/12
0529	Prospect Common	9,263	1,450	2,166	12,879	1,207	1,090	256	408	1,871	C	5/2-10/31;11/7-4/15
											H	5/13 - 4/15
0531	Spring Gulch	1,760	0	0	1,760	295	295	0	0	295	C	4/16 - 5/26
											H	4/16-5/12;11/15-1/31
0537	Padlock	1,707	2,572	0	4,279	510	336	519	0	1,029	C	4/16 - 6/15
0538	Coal Draw	2,396	0	0	2,396	208	127	0	0	208	C	2/01-3/15
0541	Three Peaks	520	0	0	1,040	60	18	0	60	120	C	7/01 - 9/30
0542	Rock Creek	1,960	0	1,320	3,280	215	125	0	185	400	C	7/01 - 8/31
0545	Grass Point	4,372	60	2,138	6,570	730	637	11	424	1,165	C	6/01 - 2/28
0556	Twenty-One Creek	1,945	0	499	2,444	320	321	0	81	401	C	8/01 - 9/30
0558	Buck Creek	545	0	640	1,185	95	95	0	213	308	C	No designated season
0560	Owl Creek	920	640	0	1,560	82	9	82	0	164	C	7/16 - 9/15

TABLE B2
LIVESTOCK GRAZING SUMMARY - CATEGORY I
(Cont'd)

		ACRES				AUM's								
						Federal								
						1/ Active	2/ Average 5- Yr. License				3/ Total Demand	4/ Livestock Class	Historical Season of Use	
Allotment Number	Allotment Name	Federal	State	Private	Total	Preference	Yr.	License	State	Private				
0568	Basin	7,816	1,188	6,865	15,869	1,095		1,090	269	1,490	2,854	C	6/01 - 10/15	
0573	Wagonhound	3,395	480	1,280	5,155	562		417	103	273	938	C	8/16 - 11/30	
0575	Owl Creek	1,667	0	2,262	3,929	227		196	0	584	811	C	6/25 - 9/09	
0579	Buffalo Creek	8,730	2,560	4,248	15,538	1,452		1,384	300	564	2,316	C	4/15-6/20; 7/1-12/31	
0596	Wagonhounds ^{2/}	7,811	640	2,880	11,331	1,556		1,237	142	445	2,143	C	5/16 - 2/28	
0605 +	Buffalo Basin	27,092				4,878						C	4/1-6/20; 10/16-2/25	
2526	(+ Section 15)	(1,047)	3,880	6,893	38,912	(+197)		4,240	882	1,821	7,718	S	3/1-7/31; 9/03-11/3	
												H	12/1 - 6/30	
0606	Upper Range	29,895	11,076	11,440	52,411	6,867		5,887	2,802	2,791	12,460	C	5/01 - 12/15	
												S	6/01 - 11/03	
0607	Lake Creek	3,704	0	1,961	5,665	734		736	0	630	1,364	C	4/20 - 2/28	
0609	Owl Creek	2,125	0	2,480	4,605	288		264	0	620	908	C	7/01 - 9/15	
0614	Rattlesnake	860	0	827	1,687	139		139	0	163	302	C	5/10 - 9/30	
0615	Lime Ridge	920	0	1,480	2,400	265		242	0	800	1,065	C	6/21 - 10/31	
0620	Prospect ^{2/}	4,940	1,200	970	7,110	1,205		1,249	321	253	1,779	C	6/01 - 11/7	
0621	North Grass Creek ^{3/}	2,360	360	240	2,960	293		309	45	28	366	C	7/01 - 11/30	
0622	South Highway ^{3/}	9,308	640	0	9,948	1,252		1,045	64	0	1,316	C	6/01 - 11/13	
0626	Timber Creek ^{3/}	8,071	0	0	8,071	800		800	0	0	800	C	5/01 - 9/30	
0627	Gooseberry	2,771	780	2,211	5,762	600		600	122	529	1,251	C	5/01 - 10/15	
0628	Hole in the Ground	1,899	0	2,514	4,413	252		252	0	391	643	C	5/16 - 9/30	
0633	Upper Pastures ^{3/}	4,701	640	3,783	9,124	1,183		1,180	155	1,145	2,483	C	5/16 - 9/30	
0634	Lower Pastures ^{3/}	9,772	640	896	11,308	1,731		1,977	142	195	2,068	C	10/01 - 6/15	
0635	Vass	764	0	461	1,225	117		113	0	117	234	C	6/16 - 9/30	
0637	Crass Creek	3,760	0	3,360	7,120	1,066		1,068	0	967	2,033	C	5/16 - 10/15	
0639	Tatnan Mountain Common	17,535	1,012	1,900	20,447	2,332		1,580	90	392	2,814	C	5/16 - 10/15	
												S	11/01 - 2/28	
0640 +	Snyder (+ Section 15)	9,577	520	1,196	13,190	626		595	53	113	937	C	5/16 - 10/15	
(2537)		(+ 1,897)				(+145)								

TABLE B2

LIVESTOCK GRAZING SUMMARY - CATEGORY I
(Cont'd)

Allotment Number	Allotment Name	ACRES				ADM's						
		Federal	State	Private	Total	Federal		State	Private	Total Demand	Livestock Class	Historical Season of Use
						1/ Active Preference	2/ Average 5- Yr. License					
0642 +	Red Canyon (+ Section 15) ^{5/} (2539)	1,293 (+5,262)	0	4,732	11,287	162 (+1,194)	1,355	0	1,144	2,500	C	4/10-8/1;10/16-12/15
0652	Fifteennmile ^{5/}	17,093	1,277	7,952	26,322	2,136	1,086	168	1,106	3,410	S	11/01 - 5/10
0662	Fifteennmile	22,236	0	5,011	27,247	2,490	1,594	0	693	3,183	C	4/01 - 10/15
0669	Allen Basin	12,321	907	1,682	14,910	835	226	87	640	1,562	S	5/01-6/03;10/01-3/31
0671	Ten Mile	24,574	640	0	25,214	1,651	1,110	36	0	1,687	C	11/01 - 2/28
0678	South Grass Creek ^{5/}	9,187	1,280	3,066	13,533	1,489	1,248	239	621	2,349	S	11/16 - 4/30
0681	Spring Creek	1,506	560	1,900	3,966	201	200	93	315	609	C	4/01 - 11/15
1070	Fifteennmile	16,094	641	585	17,320	1,420	395	64	59	1,543	C	5/16-6/15;10/23-10/29
1071	South Sleeper	4,899	640	0	5,539	1,225	406	160	0	1,385	C	11/15 - 2/11
2510		2,205	0	0	2,205	347	347	0	0	347	C	5/01 - 8/15
TOTALS FOR "I" CATEGORY		613,185	52,284	107,679	773,148	71,469	52,165	8,772	22,831	103,072		No Designated season

^{1/} Total number of animal unit months (AUMs) of livestock grazing on public lands apportioned and attached to base property owned or controlled by a permittee or lessee

^{2/} Five year average notice licensed AUMs of livestock grazing on public land (1976-1980)

^{3/} Total AUMs which can be authorized for livestock on public, state, and private land within the allotments

^{4/} C - Cattle

S - Sheep

H - Domestic Horses

^{5/} Allotments which are presently covered by an allotment management plan

+ Indicates allotments are combined

TABLE B3

LIVESTOCK GRAZING SUMMARY - CATEGORY C₁

Allotment Number	Allotment Name	ACRES				Federal					3/ Total Demand	4/ Livestock Class	Historical Season of Use
		Federal	State	Private	Total	Federal		State	Private				
						1/ Active Preference	2/ Average 5-Yr. License						
0063	Individual	80	0	0	80	11	11	0	0	11	C	6/01 - 6/30	
0504	Hamilton Dome	11,904	640	290	12,834	799	805	41	33	873	C	5/01 - 6/15	
0506	Harvey Common	1,051	0	68	1,420	98	58	0	7	105	C	5/10 - 9/26	
0512	Coulter Group	11,028	590	175	11,793	666	535	47	13	726	C	5/01 - 9/30	
0521	Cottonwood ^{2/}	7,703	0	670	8,373	411	254	0	61	472	C	4/15-5/25;11/15-1/31	
0527 + (3103)	Blackstone (+ Section 15)	920	0	0	1,729	171	243	0	0	243	C	6/01 - 9/12	
0533	Hase Ranch	+ 809	0	260	1,180	+ 72	121	0	43	175	C	5/01 - 7/13	
0539	Individual	1,780	15	40	1,835	125	125	1	3	129	C	5/01 - 7/16	
0543	Cannady Individual	1,146	0	169	1,315	58	63	0	8	66	C	5/16 - 8/15	
0546	Highway	1,200	0	0	1,200	107	107	0	0	107	C	5/01 - 10/03	
0548	Individual	1,920	0	320	2,240	151	121	0	22	173	C	5/10 - 10/12	
0554	Naugh Dome	2,503	0	360	2,863	138	138	0	23	161	C	5/01 - 6/15	
0559	Fiveville	2,954	0	160	3,114	400	324	0	13	413	C	5/01 - 10/15	
0561	Presidential Individual	1,880	621	2,672	5,173	268	267	62	307	637	C	6/01 - 9/10	
0566	Owl Creek	1,918	77	163	2,158	218	216	9	19	246	C	9/01 - 11/15	
0567	Individual	2,400	0	100	2,500	248	246	0	10	258	C	5/01 - 10/05	
0576	Elk Creek	9,382	0	0	9,382	815	320	0	0	815	S	4/16-7/20;1/02-12/31	
0577	South Basin	13,440	1,280	0	14,720	870	193	80	0	950	S	4/16-6/20;10/22-12/31	
0578	North Basin Group	5,384	0	0	5,384	350	230	0	0	350	C	4/17 - 6/30	
0580	Coal	480	555	0	1,035	97	93	126	0	223	S	10/01 - 10/21	
0588	Sandstone	1,151	0	314	1,465	75	64	0	16	91	C	5/10 - 8/14	
0597	Owl Creek	1,360	640	2,433	4,433	175	51	215	677	1,067	C	4/16 - 6/30	
0608	Vass	713	0	618	1,331	100	100	0	93	193	C	6/24 - 9/15	
0610	South Owl Creek	840	0	240	1,080	113	108	0	40	153	C	5/01 - 6/30	
0612	South Tatman	881	0	640	1,521	176	99	0	206	382	C	5/16 - 10/15	
0619	Elk Creek	19,509	0	1,289	20,798	1,438	88	0	100	1,538	S	4/21 - 6/19	
0623	North Highway	7,389	0	1,280	8,669	555	544	0	94	649	C	4/01-4/30;11/01-1/31	
0636	Haynes	465	0	286	751	131	131	0	47	178	C	5/10-6/09;11/01-1/15	
0641	Individual	1,005	0	472	1,477	56	22	0	56	112	C	6/16 - 10/15	
0648	Individual	320	0	440	760	18	18	0	90	108	C	5/01 - 7/15	
0651	Fiveville ^{2/}	39,808	0	0	39,808	2,765	1,739	0	0	2,785	C	4/15-6/30;10/01-2/28	
0653	Red Lane	600	0	441	1,041	63	64	0	60	123	C	6/01 - 11/30	
0654	Ayers Individual	560	0	0	560	125	125	0	0	125	C	5/01 - 9/30	
0664	Alamo Creek	335	0	0	335	25	26	0	0	25	C	5/01 - 6/30	
0674	North Tatman	10,956	0	314	11,270	1,060	288	0	32	1,092	S	5/10-7/09;11/01-2/02	
TOTALS FOR C ₁ CATEGORY		166,694	4,418	14,214	185,627	13,100	8,737	581	2,073	15,754			

TABLE B3
LIVESTOCK GRAZING SUMMARY - CATEGORY C₂
(Cont'd)

		ACRES				ALM's							
Allotment Number	Allotment Name	Federal	State	Private	Total	Federal		State	Private	3/ Total Demand	4/ Livestock Class	Historical Season of Use	
						1/ Active Preference	2/ Average 5- Yr. License						
0513	Dockery Hammond	930	0	0	930	80	80	0	0	80	C	7/16 - 10/25	
0528	Six Mile	1,632	0	0	1,632	134	0	0	0	134	C	12/01 - 1/10	
0544	Maller Individual	157	0	0	157	13	13	0	0	13	C	5/01 - 5/31	
0549	Greybull Bend	327	0	0	327	27	26	0	0	27	S	6/01 - 6/10	
0557	Individual	140	0	45	185	18	18	0	6	24	C	No designated season	
0583	Owl Creek	160	0	120	280	21	21	0	29	50	C	No designated season	
0611	Individual	200	0	0	200	7	10	0	0	7	C	No designated season	
0618 + (2527)	McGarry Individual (+ Section 15)	355 + 320	320	675	1,670	51 + 44	95	44	125	264	C	6/01 - 9/10	
0629 + (2534)	Rankine (+ Section 15)	199 + 199	0	0	398	17 + 37	54	0	0	54	C	No designated season	
0631	East Tatman	290	0	0	290	25	0	0	0	25	C	No designated season	
0668	Bursey Creek	10,108	0	0	10,108	505	78	0	0	505	S	11/01 - 11/15	
1065	YU Bench	40	0	0	40	18	15	0	0	18	C	No designated season	
1077	Lower	65	0	0	65	4	4	0	0	4	C	No designated season	
TOTALS FOR C ₂ CATEGORY		15,122	320	840	16,282	1,001	414	44	160	1,205			
TOTALS FOR ALL CATEGORIES		965,152	75,550	223,455	1,264,157	108,373	81,275	12,908	48,515	169,796			

1/ Total number of animal unit months (ALMs) of livestock grazing on public lands apportioned and attached to base property owned or controlled by a permittee or lessee

2/ Five year average notice licensed ALMs of livestock grazing on public land (1976-1980)

3/ Total ALMs which can be authorized for livestock on public, state, and private land within the allotments

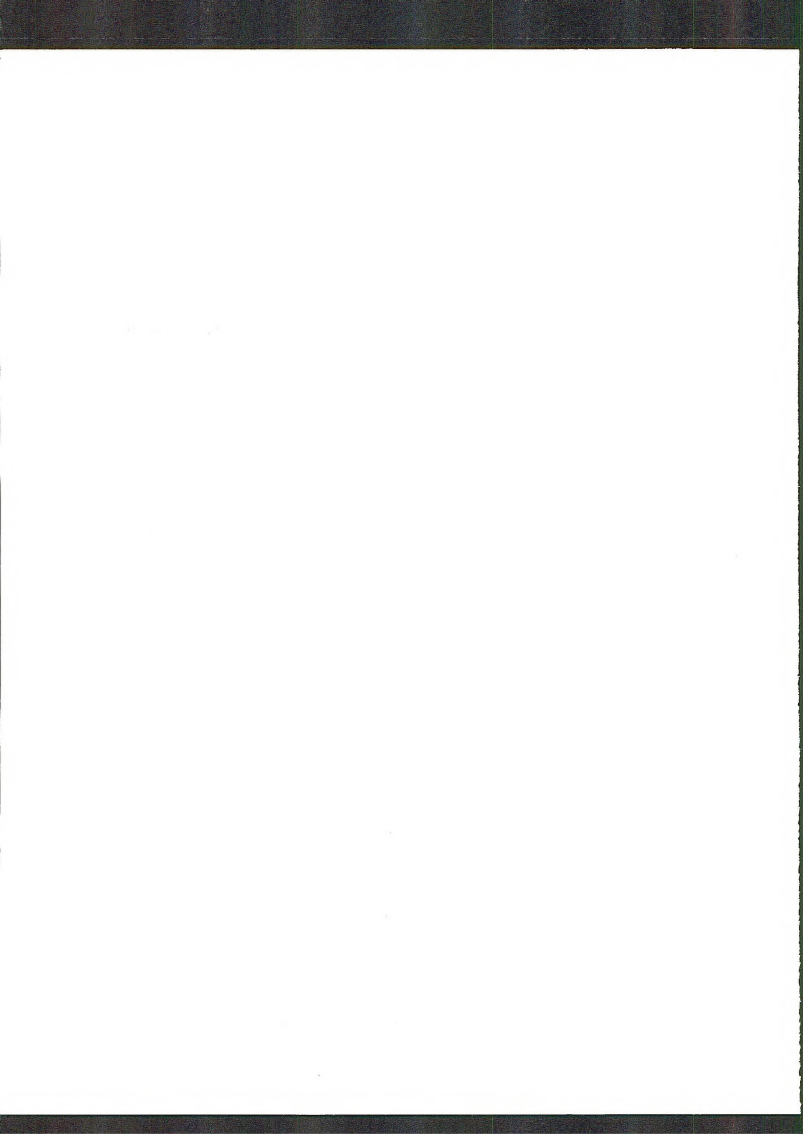
4/ C - Cattle

S - Sheep

H - Domestic Horses

5/ Allotments which are presently covered by an allotment management plan

+ Indicates allotments are combined



APPENDIX C

WYOMING GAME AND FISH STRATEGIC PLAN GOALS

APPENDIX C

APPENDIX C
WYOMING GAME AND FISH DEPARTMENT STRATEGIC PLAN GOALS 1/

Allotment No.	Category	Game Species	Winter 2/	Spring 2/	Summer 2/	Fall 2/
0622	I	Antelope	58 (55)	32 (30)	24 (23)	24 (23)
		Mule Deer	20 (20)	20 (20)	28 (28)	28 (28)
0623	C ₁	Antelope	21 (20)	21 (20)	24 (23)	24 (23)
		Mule Deer	53 (50)	53 (50)	74 (70)	74 (70)
0616	M	Antelope	- (-)	11 (10)	6 (6)	6 (6)
		Mule Deer	20 (20)	20 (20)	28 (28)	28 (28)
		Whitetail Deer	4 (2)	4 (2)	6 (3)	6 (3)
0620	I	Antelope	- (-)	- (-)	13 (11)	13 (11)
		Mule Deer	170 (125)	170 (125)	75 (55)	75 (55)
		Elk	15 (13)	15 (15)	- (-)	- (-)
0621	I	Antelope	6 (5)	10 (10)	13 (11)	13 (11)
		Mule Deer	27 (20)	27 (20)	14 (10)	14 (10)
0504	C ₁	Antelope	111 (95)	59 (50)	61 (52)	61 (52)
		Mule Deer	75 (75)	75 (75)	35 (35)	35 (35)
		Whitetail Deer	6 (3)	6 (3)	9 (5)	9 (5)
0633	I	Mule Deer	102 (75)	102 (75)	54 (40)	54 (40)
		Elk	34 (30)	28 (25)	6 (5)	6 (5)
		Moose	1 (-)	1 (-)	2 (-)	2 (-)
0634	I	Antelope	30 (25)	30 (25)	34 (29)	34 (29)
		Mule Deer	272 (200)	272 (200)	109 (80)	109 (80)
0636	C ₁	Antelope	- (-)	- (-)	4 (3)	4 (3)
		Mule Deer	4 (3)	4 (3)	5 (4)	5 (4)
0604	M	Antelope	302 (260)	263 (244)	157 (144)	157 (144)
		Mule Deer	115 (95)	115 (95)	156 (147)	156 (147)
0605 & 2526	I	Antelope	166 (145)	104 (90)	112 (97)	112 (97)
		Mule Deer	459 (365)	459 (365)	200 (160)	200 (160)
		Elk	28 (25)	28 (25)	9 (8)	9 (8)
		Whitetail Deer	4 (2)	4 (2)	6 (3)	6 (3)
0606	I	Antelope	- (-)	20 (-)	20 (-)	20 (-)
		Mule Deer	515 (400)	515 (400)	194 (150)	194 (150)
		Elk	53 (50)	53 (50)	26 (25)	26 (25)
		Moose	14 (10)	14 (10)	14 (14)	14 (14)
0678	I	Antelope	12 (10)	12 (10)	7 (6)	7 (6)
		Mule Deer	135 (100)	135 (100)	44 (33)	44 (33)
0521	C ₁	Antelope	6 (5)	35 (30)	5 (4)	5 (4)
		Mule Deer	38 (35)	38 (35)	53 (49)	53 (49)
		Whitetail Deer	8 (4)	8 (4)	12 (6)	12 (6)
0522	I	Antelope	21 (20)	32 (30)	18 (17)	18 (17)
		Mule Deer	16 (15)	16 (15)	23 (21)	23 (21)
0523	M	Antelope	32 (30)	33 (30)	63 (57)	63 (57)
		Mule Deer	40 (35)	40 (35)	47 (40)	47 (40)
		Whitetail Deer	4 (2)	4 (2)	6 (3)	6 (3)
0642 & 2539	I	Antelope	- (-)	- (-)	20 (17)	20 (17)
		Mule Deer	101 (75)	101 (75)	142 (105)	142 (105)
0643	M	Antelope	11 (10)	22 (20)	19 (18)	19 (18)
		Mule Deer	27 (25)	27 (25)	38 (35)	38 (35)
0644	M	Antelope	5 (5)	5 (5)	7 (7)	7 (7)
		Mule Deer	16 (15)	16 (15)	23 (21)	23 (21)
		Whitetail Deer	6 (3)	6 (3)	9 (5)	9 (5)
0645	M	Antelope	- (-)	5 (5)	5 (5)	5 (5)
		Mule Deer	27 (25)	27 (25)	38 (35)	38 (35)

APPENDIX C

APPENDIX C WYOMING GAME AND FISH DEPARTMENT STRATEGIC PLAN GOALS 1/ (Cont'd)

Allotment		Category	Game Species	Winter 2/		Spring 2/		Summer 2/		Fall 2/	
No.											
0646		M	Antelope	-	(-)	-	(-)	6	(5)	6	(5)
			Mule Deer	40	(30)	40	(30)	19	(14)	19	(14)
0647		M	Antelope	-	(-)	11	(10)	6	(6)	6	(6)
			Mule Deer	11	(10)	11	(10)	15	(14)	15	(14)
0552		M	Mule Deer	28	(20)	28	(20)	14	(10)	14	(10)
			Elk	18	(16)	17	(15)	-	(-)	-	(-)
0553		M	Antelope	-	(-)	-	(-)	41	(35)	41	(35)
			Mule Deer	137	(100)	137	(100)	35	(25)	35	(25)
0554		G ₁	Antelope	53	(50)	21	(20)	12	(11)	12	(11)
			Mule Deer	5	(5)	5	(5)	8	(7)	8	(7)
0556		I	Antelope	-	(-)	-	(-)	20	(17)	20	(17)
			Mule Deer	34	(25)	34	(25)	16	(12)	16	(12)
0558		I	Mule Deer	20	(15)	20	(15)	9	(7)	9	(7)
			Elk	39	(35)	11	(10)	11	(10)	11	(10)
0529		I	Antelope	-	(-)	-	(-)	67	(57)	67	(57)
			Mule Deer	136	(100)	136	(100)	60	(44)	60	(44)
0557		C ₂	Mule Deer	3	(2)	3	(2)	4	(3)	4	(3)
			Whitetail Deer	4	(2)	4	(2)	6	(3)	6	(3)
0540		M	Antelope	-	(-)	18	(15)	13	(11)	13	(11)
			Mule Deer	20	(25)	20	(25)	9	(7)	9	(7)
			Elk	3	(2)	3	(2)	-	(-)	-	(-)
0541		I	Mule Deer	-	(-)	-	(-)	47	(35)	47	(35)
			Elk	9	(8)	9	(8)	17	(15)	17	(15)
			Bighorn Sheep	4	(2)	4	(2)	-	(-)	-	(-)
0542		I	Mule Deer	-	(-)	-	(-)	34	(25)	34	(25)
			Elk	6	(5)	23	(20)	28	(25)	28	(25)
			Bighorn Sheep	10	(6)	10	(6)	10	(6)	10	(6)
0524		I	Mule Deer	27	(20)	27	(20)	19	(14)	19	(14)
			Elk	17	(15)	34	(30)	-	(-)	-	(-)
0525 & 0550		I	Antelope	-	(-)	-	(-)	20	(17)	20	(17)
			Mule Deer	7	(5)	7	(5)	47	(35)	47	(35)
			Elk	6	(5)	17	(15)	17	(15)	17	(15)
			Bighorn Sheep	7	(5)	7	(5)	5	(-)	5	(-)
0573		I	Antelope	135	(115)	35	(30)	7	(6)	7	(6)
			Mule Deer	34	(25)	34	(25)	20	(15)	20	(15)
			Whitetail Deer	6	(3)	6	(3)	9	(5)	9	(5)
0574		M	Antelope	5	(5)	11	(10)	11	(10)	11	(10)
			Mule Deer	16	(15)	16	(15)	23	(21)	23	(21)
0575		I	Antelope	-	(-)	6	(5)	13	(11)	13	(11)
			Mule Deer	7	(5)	7	(5)	34	(25)	34	(25)
			Elk	11	(10)	6	(5)	10	(9)	10	(9)
0679		M	Mule Deer	14	(10)	14	(10)	19	(14)	19	(14)
			Antelope	5	(5)	5	(5)	5	(5)	5	(5)

APPENDIX C

APPENDIX C WYOMING GAME AND FISH DEPARTMENT STRATEGIC PLAN GOALS 1/ (Cont'd)

Allotment No.	Category	Game Species	Winter 2/	Spring 2/	Summer 2/	Fall 2/
0534	M	Antelope	24 (23)	24 (23)	24 (23)	24 (23)
		Mule Deer	16 (15)	16 (15)	23 (21)	23 (21)
		Whitetail Deer	4 (2)	4 (2)	6 (3)	6 (3)
0535	M	Antelope	135 (115)	23 (20)	54 (46)	54 (46)
		Mule Deer	116 (85)	116 (85)	54 (40)	54 (40)
0536	M	Antelope	12 (10)	12 (10)	25 (21)	25 (21)
		Mule Deer	7 (5)	7 (5)	11 (7)	11 (7)
0537	I	Antelope	47 (40)	47 (40)	41 (35)	41 (35)
		Mule Deer	14 (10)	14 (10)	19 (14)	19 (14)
0538	I	Antelope	11 (10)	11 (10)	12 (11)	12 (11)
		Mule Deer	5 (5)	5 (5)	8 (7)	8 (7)
0596	I	Antelope	35 (30)	24 (20)	54 (46)	54 (46)
		Mule Deer	373 (275)	373 (275)	68 (50)	68 (50)
0597	C ₁	Antelope	- (-)	- (-)	34 (29)	34 (29)
		Mule Deer	7 (5)	7 (5)	34 (25)	34 (25)
		Elk	11 (10)	17 (15)	11 (10)	11 (10)
		Bighorn Sheep	2 (-)	2 (-)	- (-)	- (-)
		Moose	2 (1)	2 (1)	1 (1)	1 (1)
0568	I	Antelope	- (-)	35 (30)	68 (58)	68 (58)
		Mule Deer	34 (25)	34 (25)	68 (35)	68 (35)
		Elk	45 (40)	28 (25)	28 (25)	28 (25)
		Moose	2 (-)	2 (-)	3 (-)	3 (-)
		Bighorn Sheep	4 (-)	4 (-)	- (-)	- (-)
0569	M	Antelope	- (-)	18 (15)	101 (86)	101 (86)
		Mule Deer	272 (200)	272 (200)	203 (150)	203 (150)
		Elk	17 (15)	17 (15)	9 (8)	9
0584	M	Antelope	- (-)	29 (25)	67 (57)	67 (57)
		Mule Deer	34 (25)	34 (25)	16 (12)	16 (12)
		Elk	34 (30)	34 (30)	- (-)	- (-)
0585	M	Antelope	- (-)	29 (25)	13 (11)	13 (11)
		Mule Deer	54 (40)	54 (40)	24 (18)	24 (18)
0586	M	Antelope	- (-)	- (-)	10 (8)	10 (8)
		Mule Deer	34 (25)	34 (25)	16 (12)	16 (12)
0587	M	Antelope	- (-)	- (-)	9 (8)	9 (8)
		Mule Deer	34 (25)	34 (25)	16 (12)	16 (12)
0652	I	Antelope	53 (50)	37 (35)	24 (23)	24 (23)
		Mule Deer	80 (75)	80 (75)	111 (105)	111 (105)
0669	I	Antelope	5 (5)	11 (10)	12 (11)	12 (11)
		Mule Deer	16 (15)	16 (15)	22 (21)	22 (21)
0670	M	Antelope	32 (30)	16 (15)	31 (29)	31 (29)
		Mule Deer	16 (15)	16 (15)	22 (21)	22 (21)
0671	I	Antelope	100 (95)	21 (20)	12 (11)	12 (11)
		Mule Deer	74 (70)	74 (70)	104 (98)	104 (98)
2555	M	Antelope	223 (120)	23 (20)	33 (28)	33 (28)
		Mule Deer	22 (22)	22 (22)	30 (30)	30 (30)
0662	I	Antelope	52 (50)	37 (35)	24 (23)	24 (23)
		Mule Deer	106 (100)	106 (100)	148 (140)	148 (140)
0663	M	Antelope	- (-)	16 (15)	18 (17)	18 (17)
		Mule Deer	11 (10)	11 (10)	15 (14)	15 (14)

APPENDIX C

APPENDIX C WYOMING GAME AND FISH DEPARTMENT STRATEGIC PLAN GOALS 1/ (Cont'd)

Allotment No.	Category	Game Species	Winter 2/	Spring 2/	Summer 2/	Fall 2/
2551	M	Antelope	5 (5)	16 (15)	30 (28)	30 (28)
		Mule Deer	11 (10)	11 (10)	16 (14)	16 (14)
0639	I	Antelope	- (-)	- (-)	24 (23)	24 (23)
		Mule Deer	265 (265)	265 (265)	371 (371)	371 (371)
		Whitetail Deer	40 (20)	40 (20)	60 (30)	60 (30)
0640 & 2537	I	Antelope	- (-)	- (-)	33 (28)	33 (28)
		Mule Deer	161 (160)	161 (160)	185 (185)	185 (185)
0509	I	Antelope	95 (90)	142 (135)	170 (161)	170 (161)
		Mule Deer	92 (90)	92 (90)	129 (126)	129 (126)
0612	C ₁	Mule Deer	10 (10)	10 (10)	14 (14)	14 (14)
0674	C ₁	Antelope	- (-)	21 (20)	12 (11)	12 (11)
		Mule Deer	42 (42)	42 (42)	59 (59)	59 (59)
0668	C ₂	Antelope	- (-)	5 (5)	18 (17)	18 (17)
		Mule Deer	35 (34)	35 (34)	49 (48)	49 (48)
0651	C ₁	Antelope	73 (70)	42 (40)	61 (58)	61 (58)
		Mule Deer	27 (25)	27 (25)	37 (35)	37 (35)
0626	I	Antelope	79 (75)	137 (130)	31 (29)	31 (29)
		Mule Deer	27 (25)	27 (25)	35 (33)	35 (33)
0627	I	Antelope	- (-)	- (-)	11 (9)	11 (9)
		Mule Deer	91 (78)	91 (78)	34 (28)	34 (28)
		Elk	10 (10)	15 (15)	- (-)	- (-)
0628	I	Mule Deer	27 (25)	27 (25)	37 (35)	37 (35)
		Antelope	- (-)	10 (10)	10 (10)	10 (10)
0629	C ₂	Mule Deer	20 (20)	20 (20)	28 (28)	28 (28)
		Whitetail Deer	4 (2)	4 (2)	6 (3)	6 (3)
0630	M	Antelope	6 (5)	18 (15)	34 (29)	34 (29)
		Mule Deer	28 (25)	28 (25)	8 (7)	8 (7)
		Elk	25 (25)	25 (25)	- (-)	- (-)
2533	M	Antelope	- (-)	6 (5)	20 (17)	20 (17)
		Mule Deer	31 (25)	31 (25)	12 (10)	12 (10)
		Elk	30 (30)	30 (30)	- (-)	- (-)
		Whitetail Deer	5 (-)	5 (-)	5 (-)	5 (-)
2534	C ₂	Mule Deer	5 (5)	5 (5)	7 (7)	7 (7)
		Whitetail Deer	4 (2)	4 (2)	6 (3)	6 (3)
2522	M	Antelope	6 (5)	6 (5)	7 (6)	7 (6)
		Mule Deer	6 (5)	6 (5)	8 (7)	8 (7)
		Whitetail Deer	4 (2)	4 (2)	6 (3)	6 (3)
0594	M	Antelope	10 (10)	10 (10)	10 (10)	10 (10)
		Mule Deer	61 (50)	61 (50)	85 (70)	85 (70)
		Elk	5 (5)	5 (5)	- (-)	- (-)
0595	M	Antelope	5 (5)	6 (5)	27 (23)	27 (23)
		Mule Deer	30 (25)	30 (25)	34 (28)	34 (28)
		Elk	5 (5)	5 (5)	- (-)	- (-)
0637	I	Mule Deer	68 (50)	68 (50)	95 (70)	95 (70)
0510 & 2508 & 3091	I	Antelope	- (-)	17 (15)	14 (12)	14 (12)
		Mule Deer	91 (90)	91 (90)	128 (126)	128 (126)
0526	I	Antelope	- (-)	17 (15)	19 (17)	19 (17)
		Mule Deer	18 (17)	18 (17)	25 (24)	25 (24)

APPENDIX C

APPENDIX C WYOMING GAME AND FISH DEPARTMENT STRATEGIC PLAN GOALS 1/ (Cont'd)

Allotment No.	Category	Game Species	Winter 2/	Spring 2/	Summer 2/	Fall 2/
0527	C ₁	Antelope Mule Deer	- (-) 10 (10)	- (-) 10 (10)	7 (6) 14 (14)	7 (6) 14 (14)
0519	M	Mule Deer Elk	24 (20) 25 (25)	24 (20) 30 (30)	17 (14) - (-)	17 (14) - (-)
0520	M	Antelope Mule Deer	- (-) 6 (5)	5 (-) 6 (5)	5 (-) 8 (7)	5 (-) 8 (7)
0672	M	Mule Deer Elk	42 (35) 25 (25)	42 (35) 25 (25)	24 (20) - (-)	24 (20) - (-)
0530	M	Mule Deer Antelope	135 (100) - (-)	135 (100) - (-)	135 (100) 10 (10)	135 (100) 10 (10)
0531	I	Antelope Mule Deer	- (-) 34 (25)	- (-) 34 (25)	7 (6) 18 (13)	7 (6) 18 (13)
0665	M	Antelope Mule Deer Whitetail Deer	11 (10) 81 (75) 6 (3)	5 (5) 81 (75) 6 (3)	6 (6) 113 (105) 8 (4)	6 (6) 113 (105) 8 (4)
1070	I	Antelope Mule Deer	74 (70) 69 (65)	16 (15) 69 (65)	24 (23) 95 (90)	24 (23) 95 (90)
1071	I	Antelope Mule Deer	- (-) 60 (60)	23 (20) 60 (60)	20 (17) 84 (84)	20 (17) 84 (84)
0559	C ₁	Antelope Mule Deer	111 (105) 53 (50)	21 (20) 53 (50)	24 (23) 74 (70)	24 (23) 74 (70)
0579	I	Antelope Mule Deer Whitetail Deer	63 (60) 25 (25) 4 (2)	79 (75) 25 (25) 4 (2)	84 (80) 35 (35) 6 (3)	84 (80) 35 (35) 6 (3)
0580	C ₁	Mule Deer	34 (25)	34 (25)	16 (12)	16 (12)
0564	M	Antelope Mule Deer	- (-) 22 (18)	- (-) 22 (18)	16 (14) 26 (21)	16 (14) 26 (21)
2510	I	Antelope Mule Deer	- (10) 43 (35)	35 (30) 43 (35)	27 (23) 24 (20)	27 (23) 24 (20)
2511	M	Antelope Mule Deer	6 (5) 6 (5)	- (-) 6 (5)	7 (6) 8 (7)	7 (6) 8 (7)
0576	C ₁	Antelope Mule Deer	- (-) 16 (15)	- (-) 16 (15)	5 (5) 22 (21)	5 (5) 22 (21)
0577	C ₁	Antelope Mule Deer	32 (30) 106 (100)	11 (10) 106 (100)	24 (23) 148 (140)	24 (23) 148 (140)
0578	C ₁	Antelope Mule Deer	21 (20) 10 (10)	21 (20) 10 (10)	36 (34) 14 (14)	36 (34) 14 (14)
0545	I	Antelope Mule Deer Whitetail Deer	11 (8) 38 (13) 2 (2)	27 (18) 38 (13) 2 (2)	19 (12) 15 (5) 3 (3)	19 (12) 15 (5) 3 (3)

APPENDIX C

APPENDIX C
WYOMING GAME AND FISH DEPARTMENT STRATEGIC PLAN GOALS 1/
(Cont'd)

Allotment No.	Category	Game Species	Winter 2/	Spring 2/	Summer 2/	Fall 2/
0508	I	Antelope Mule Deer	654 (620) 490 (465)	127 (120) 490 (465)	103 (69) 686 (651)	103 (69) 686 (651)
0507	I	Antelope Mule Deer	116 (110) 124 (120)	116 (110) 124 (120)	73 (69) 174 (168)	73 (69) 174 (168)
0512	C ₁	Antelope Mule Deer	90 (85) 42 (40)	21 (20) 42 (40)	18 (17) 59 (56)	18 (17) 59 (56)
0613	M	Antelope Mule Deer	- (-) 102 (75)	23 (23) 102 (75)	3 (3) 20 (15)	3 (3) 20 (15)
0614	I	Mule Deer	20 (25)	20 (25)	9 (7)	9 (7)
0615	I	Antelope Mule Deer Elk Bighorn Sheep	6 (5) 14 (10) 28 (25) 8 (5)	6 (5) 14 (10) 28 (25) 8 (5)	20 (17) 19 (14) 6 (5) 0 (-)	20 (17) 19 (14) 6 (5) 0 (-)
0551	M	Antelope Mule Deer	- (-) 68 (50)	12 (10) 68 (50)	18 (15) 31 (23)	18 (15) 31 (23)
0582	M	Antelope Mule Deer	- (-) 47 (35)	6 (5) 47 (35)	7 (6) 16 (12)	7 (6) 16 (12)
0661	M	Antelope Mule Deer Elk Moose Bighorn Sheep	- (-) 203 (150) 141 (125) 3 (-) 20 (15)	35 (30) 203 (150) 106 (94) 3 (-) 20 (15)	27 (23) 109 (80) 68 (60) 4 (1) - (-)	27 (23) 109 (80) 68 (60) 4 (1) - (-)
0680	M	Mule Deer Elk Bighorn Sheep Moose	135 (100) 79 (70) 10 (5) 4 (2)	135 (100) 102 (90) 10 (5) 4 (2)	54 (40) 20 (18) - (-) 6 (3)	54 (40) 20 (18) - (-) 6 (3)
0681	I	Mule Deer Elk	170 (125) 45 (40)	170 (125) 23 (20)	48 (35) 1 (1)	48 (35) 1 (1)
0638	M	Antelope Mule Deer	11 (10) 16 (15)	5 (5) 16 (15)	6 (6) 23 (21)	6 (6) 23 (21)
0619	C ₁	Antelope Mule Deer	63 (60) 37 (35)	37 (35) 37 (35)	31 (29) 51 (49)	31 (29) 51 (49)
0503 and 0590	I	Antelope Mule Deer Whitetail Deer	- (-) 21 (20) 4 (2)	- (-) 21 (20) 4 (2)	6 (6) 31 (28) 6 (3)	6 (6) 31 (28) 6 (3)
0607	I	Antelope Mule Deer Elk	- (-) 238 (175) 17 (15)	- (-) 238 (175) 17 (15)	6 (5) 85 (63) - (-)	6 (5) 85 (63) - (-)
0608	C ₁	Antelope Mule Deer	- (-) 34 (25)	18 (15) 34 (25)	27 (23) 14 (10)	27 (23) 14 (10)
0609	I	Mule Deer Elk Moose Bighorn Sheep	8 (6) 11 (10) 2 (1) 8 (5)	8 (6) 11 (10) 2 (1) 8 (5)	34 (25) 11 (10) 3 (1) 8 (5)	34 (25) 11 (10) 3 (1) 8 (5)
0654	C ₁	Antelope Mule Deer	- (-) 14 (10)	17 (15) 14 (10)	19 (17) 19 (14)	19 (17) 19 (14)
2562	M	Antelope Mule Deer	2 (5) 20 (20)	23 (20) 20 (20)	20 (17) 28 (28)	20 (17) 28 (28)

APPENDIX C

APPENDIX C
WYOMING GAME AND FISH DEPARTMENT STRATEGIC PLAN GOALS 1/
(Cont'd)

Allotment No.	Category	Game Species	Winter 2/	Spring 2/	Summer 2/	Fall 2/
0631	C ₂	Antelope	- (-)	5 (5)	6 (6)	6 (6)
		Mule Deer	5 (5)	5 (5)	7 (7)	7 (7)
0639	I	Antelope	- (-)	- (-)	24 (23)	24 (23)
		Mule Deer	265 (265)	265 (265)	371 (371)	371 (371)
0549	C ₂	Antelope	- (-)	5 (5)	12 (11)	12 (11)
		Mule Deer	5 (5)	5 (5)	7 (7)	7 (7)
		Whitetail Deer	4 (2)	4 (2)	6 (3)	6 (3)
0548	C ₁	Mule Deer	5 (5)	5 (5)	8 (7)	8 (7)
0567	C ₁	Antelope	11 (10)	11 (10)	6 (6)	6 (6)
		Mule Deer	5 (5)	5 (5)	8 (7)	8 (7)
0618	C ₂	Antelope	- (-)	- (-)	7 (6)	7 (6)
		Mule Deer	5 (5)	5 (5)	7 (7)	7 (7)
2527	C ₂	Antelope	- (-)	- (-)	7 (6)	7 (6)
		Mule Deer	5 (5)	5 (5)	7 (7)	7 (7)
0610	C ₁	Antelope	- (-)	12 (10)	11 (9)	11 (9)
		Mule Deer	7 (5)	7 (5)	9 (7)	9 (7)
2518	M	Mule Deer	7 (5)	7 (5)	9 (7)	9 (7)
0572	M	Antelope	35 (30)	35 (30)	7 (6)	7 (6)
		Mule Deer	14 (10)	14 (10)	19 (14)	19 (14)
0528	C ₂	Antelope	26 (25)	11 (10)	6 (6)	6 (6)
		Mule Deer	16 (15)	16 (15)	22 (21)	22 (21)
0539	C ₁	Antelope	15 (15)	5 (5)	- (-)	- (-)
		Mule Deer	27 (15)	27 (15)	37 (21)	37 (21)
0664	C ₁	Antelope	13 (12)	5 (5)	6 (6)	6 (6)
		Mule Deer	11 (10)	11 (10)	15 (14)	15 (14)
0588	C ₁	Antelope	26 (25)	5 (5)	12 (11)	12 (11)
		Mule Deer	11 (11)	11 (11)	15 (15)	15 (15)
0543	C ₁	Antelope	- (-)	5 (5)	- (-)	- (-)
		Mule Deer	10 (11)	10 (11)	14 (14)	14 (14)
0546	C ₁	Mule Deer	3 (3)	3 (3)	4 (4)	4 (4)
0513	C ₂	Mule Deer	3 (3)	3 (3)	4 (4)	4 (4)
0561	C ₁	Mule Deer	16 (15)	16 (15)	24 (22)	24 (22)
0566	C ₁	Antelope	5 (5)	5 (5)	12 (11)	12 (11)
		Mule Deer	5 (5)	5 (5)	8 (7)	8 (7)
0657	M	Antelope	11 (10)	5 (5)	4 (4)	4 (4)
		Mule Deer	9 (8)	9 (8)	12 (11)	12 (11)
0650	M	Antelope	26 (25)	5 (5)	7 (7)	7 (7)
		Mule Deer	5 (5)	5 (5)	8 (7)	8 (7)
0560	I	Mule Deer	7 (5)	7 (5)	50 (37)	50 (37)
		Elk	- (-)	23 (20)	11 (10)	11 (10)
		Bighorn Sheep	6 (3)	6 (3)	- (-)	- (-)
0516	I	Mule Deer	162 (125)	162 (125)	57 (42)	57 (42)
		Elk	40 (35)	40 (35)	25 (22)	25 (22)
		Bighorn Sheep	4 (2)	4 (2)	- (-)	- (-)
		Moose	4 (3)	4 (3)	6 (4)	6 (4)

APPENDIX C

APPENDIX C
WYOMING GAME AND FISH DEPARTMENT STRATEGIC PLAN GOALS 1/
(Cont'd)

Allotment No.	Category	Game Species	Winter 2/	Spring 2/	Summer 2/	Fall 2/
0635	I	Mule Deer	27 (20)	27 (20)	54 (40)	54 (40)
		Elk	17 (15)	28 (25)	28 (25)	28 (25)
		Bighorn Sheep	2 (2)	2 (2)	- (-)	- (-)
		Moose	1 (1)	1 (1)	1 (1)	1 (1)
0532	M	Mule Deer	27 (20)	27 (20)	19 (14)	19 (14)
		Elk	6 (5)	6 (5)	- (-)	- (-)
0533	C ₁	Antelope	- (-)	6 (5)	13 (11)	13 (11)
		Mule Deer	34 (25)	34 (25)	16 (12)	16 (12)
0506	C ₁	Mule Deer	5 (5)	5 (5)	8 (7)	8 (7)
		Whitetail Deer	4 (2)	4 (2)	6 (3)	6 (3)
0593	M	Antelope	117 (100)	82 (70)	70 (60)	35 (30)
		Mule Deer	34 (25)	34 (25)	47 (35)	47 (35)
2501	M	Mule Deer	14 (10)	14 (10)	19 (14)	19 (14)
1077	C ₂	Mule Deer	3 (3)	3 (3)	4 (4)	4 (4)
0641	C ₁	Antelope	- (-)	18 (17)	18 (17)	18 (17)
		Mule Deer	5 (5)	5 (5)	8 (7)	8 (7)
		Whitetail Deer	4 (2)	4 (2)	6 (3)	6 (3)
0648	C ₁	Antelope	- (-)	- (-)	4 (3)	4 (3)
		Mule Deer	7 (5)	7 (5)	9 (7)	9 (7)
0653	C ₁	Mule Deer	5 (5)	5 (5)	8 (7)	8 (7)
		Whitetail Deer	4 (2)	4 (2)	6 (3)	6 (3)
0544	C ₂	Antelope	- (-)	- (-)	6 (6)	6 (6)
		Mule Deer	5 (5)	5 (5)	7 (7)	7 (7)
0515	M	Antelope	- (-)	35 (30)	178 (152)	178 (152)
		Mule Deer	244 (200)	244 (200)	342 (280)	342 (280)
		Whitetail Deer	20 (10)	20 (10)	30 (15)	30 (14)
		Elk	137 (137)	100 (100)	86 (86)	86 (86)
		Moose	15 (10)	15 (10)	14 (14)	14 (14)
0063	C ₁	Mule Deer	5 (5)	5 (5)	7 (7)	7 (7)
		Whitetail Deer	5 (3)	5 (3)	6 (5)	6 (5)
1065	C ₂	Mule Deer	2 (2)	2 (2)	3 (3)	3 (3)
2540	M	Mule Deer	14 (10)	14 (10)	19 (14)	19 (14)
2563	M	Antelope	6 (5)	6 (5)	20 (17)	20 (17)
		Mule Deer	31 (25)	31 (25)	14 (12)	14 (12)
		Whitetail Deer	4 (2)	4 (2)	6 (3)	6 (3)
0599	M	Antelope	- (-)	35 (35)	35 (35)	35 (35)
		Mule Deer	171 (140)	171 (140)	92 (75)	92 (75)
		Elk	80 (80)	60 (60)	- (-)	- (-)
		Whitetail Deer	12 (6)	12 (6)	18 (9)	18 (9)
0600	M	Antelope	- (-)	- (-)	20 (17)	20 (17)
		Mule Deer	49 (40)	49 (40)	31 (25)	31 (25)
		Elk	45 (45)	20 (20)	- (-)	- (-)
0601	M	Antelope	- (-)	- (-)	5 (-)	5 (-)
		Mule Deer	43 (35)	43 (35)	24 (20)	24 (20)
		Elk	25 (25)	30 (30)	- (-)	- (-)

APPENDIX C

APPENDIX C WYOMING GAME AND FISH DEPARTMENT STRATEGIC PLAN GOALS ^{1/} (Cont'd)

Allotment No.	Category	Game Species	Winter 2/	Spring 2/	Summer 2/	Fall 2/
0611	C ₂	Mule Deer	5 (5)	5 (5)	7 (7)	7 (7)
0583	C ₂	Mule Deer	2 (2)	2 (2)	3 (3)	3 (3)
2538	M	Mule Deer	14 (10)	14 (10)	19 (14)	19 (14)
3033	M	Mule Deer	11 (10)	11 (10)	15 (14)	15 (14)
		Antelope	47 (40)	18 (15)	13 (11)	13 (11)
0704	M	Mule Deer	6 (3)	6 (3)	3 (2)	3 (2)
		Antelope	3 (2)	7 (4)	5 (3)	5 (3)
0705	M	Mule Deer	13 (13)	13 (13)	6 (6)	6 (6)
		Antelope	- (-)	3 (2)	2 (2)	2 (2)
		Whitetail Deer	2 (2)	2 (2)	3 (3)	3 (3)

^{1/} 1978 plan with revisions through 1981

^{2/} Numbers in () indicate 1979 wildlife numbers

APPENDIX D

VEGETATION

D1 Major Ecological Communities and Corresponding Range Sites

**D2 Present Ecological Condition, Trend, and Suitability — Category
M**

D3 Present Condition, Trend, and Suitability — Category I

D4 Present Condition, Trend, and Suitability — Categories C₁ and C₂

**D5 Summary Present Condition, Trend and Suitability for Each
Category**

D6 Range Suitability Criteria — Cattle

TABLE D1

MAJOR ECOLOGICAL COMMUNITIES AND CORRESPONDING RANGE SITES
(Public, State, and Private Land Inventoried)

Ecological Community	Acres ^{1/}	Percent ^{1/} of Area	Corresponding ^{2/} Range Site(s)	Common Species in Climax Communities
(1) Basin Grassland/Shrub	152,000	12	Shallow/Sandy (19,500 acres)	5-9" Bluebunch wheatgrass, Indian rice- grass, Needleandthread grass, Silver sagebrush
			Sandy (79,700 acres)	5-9" Bluebunch wheatgrass, Indian rice- grass, Needleandthread grass, Prairie junegrass, Big sagebrush
			Loamy (47,200 acres)	5-9" Bluebunch wheatgrass, Indian rice- grass, Needleandthread grass, Rhizomatous wheatgrass, Big sagebrush
			Shallow/Loamy (5,300 acres)	5-9" Bluebunch wheatgrass, Indian rice- grass, Rhizomatous wheatgrass, Big sagebrush
			Shallow/Clayey (300 acres)	5-9" Bluebunch wheatgrass, Bottlebrush squirreltail, Indian ricegrass, Rhizomatous wheatgrass, Gardner saltbush, Bud sagebrush
(2) Prairie Grassland	0	0	Sands (0 acres)	5-9" Needleandthread grass, Prairie sandreed, Indian ricegrass, Silver sagebrush, Spiny hopsage
(3) Saline Shrub	318,600	26	Shale (2,500 acres)	5-9" Bottlebrush squirreltail, Indian ricegrass, Rhizomatous wheatgrass, Birdfoot sagebrush, Gardner saltbush
			Saline/Upland (243,700 acres)	5-9" Bottlebrush squirreltail, Indian ricegrass, Rhizomatous wheatgrass, Bud sagebrush, Gardner saltbush

TABLE D1

MAJOR ECOLOGICAL COMMUNITIES AND CORRESPONDING RANGE SITES
(Public, State, and Private Land Inventoried)
(Cont'd)

Ecological Community	Acres ^{1/}	Percent ^{1/} of Area	Corresponding ^{2/} Range Site(s)	Common Species in Climax Communities
			Shale 10-14" (4,000 acres)	Bluebunch wheatgrass, Bottlebrush squirreltail, Gardner's saltbush, Indian ricegrass, Needleandthread, Birdfoot sagebrush
			Saline/Upland 10-14" (68,400 acres)	Bluebunch wheatgrass, Bottlebrush squirreltail, Indian ricegrass, Rhizomatous wheatgrass, Gardner saltbush
			Impervious Clay 5-9" (0 acres)	Bottlebrush squirreltail, Indian ricegrass, Rhizomatous wheatgrass, Gardner saltbush
(4) Foothill Grassland/ Shrub	353,900	29	Shallow Sandy 10-14" (57,800 acres)	Bluebunch wheatgrass, Bottlebrush squirreltail, Indian ricegrass, Rhizomatous wheatgrass, Black sagebrush
			Sandy 10-14" (42,500 acres)	Bluebunch wheatgrass, Indian ricegrass, Big sagebrush, Needleandthread grass, Rhizomatous wheatgrass
			Shallow/Loamy 10-14" (138,800 acres)	Bluebunch wheatgrass, Indian rice- grass, Needleandthread grass, Prairie junegrass, Rhizomatous wheatgrass
			Loamy 10-14" (104,900 acres)	Bluebunch wheatgrass, Green needle- grass, Spike fescue, Indian rice- grass, Needleandthread grass, Rhizomatous wheatgrass
			Shallow/Clayey 10-14" (6,400 acres)	Bluebunch wheatgrass, Green needle- grass, Indian ricegrass, Rhizomatous wheatgrass

TABLE D1

MAJOR ECOLOGICAL COMMUNITIES AND CORRESPONDING RANGE SITES
(Public, State, and Private Land Inventoried)
(Cont'd)

Ecological Community	Acres ^{1/}	Percent ^{1/} of Area	Corresponding ^{2/} Range Site(s)	Common Species in Climax Communities
(5) Mountain Grassland/Shrub	91,700	7	Clayey (3,500 acres)	10-14" Bluebunch wheatgrass, Bottlebrush squirreltail, Green needlegrass, Indian ricegrass, Mutton bluegrass, Rhizomatous wheatgrass
			Sandy (0 acres)	15-19" Columbia needlegrass, Mountain brome, Big sagebrush, Prairie june- grass, Rhizomatous wheatgrass
			Shallow/Sandy (0 acres)	15-19" Columbia needlegrass, Idaho fescue, Mountain brome, Needleandthread grass, Prairie junegrass, Big sagebrush
			Shallow/Loamy (73,000 acres)	15-19" Columbia needlegrass, Idaho fescue, Prairie junegrass, Spike fescue, Rhizomatous wheatgrass
			Loamy (13,300 acres)	15-19" Bluebunch wheatgrass, Columbia needlegrass, Idaho fescue, Spike fescue, Big sagebrush
			Shallow/Clayey (4,300 acres)	15-19" Bluebunch wheatgrass, Columbia needlegrass, Big sagebrush, Idaho fescue, Rhizomatous wheatgrass, Spike fescue
(6) Wet Meadow	100	1	Clayey (1,100 acres)	15-19" Bluebunch wheatgrass, Columbia needlegrass, Spike fescue, Idaho fescue, Rhizomatous wheatgrass, Big sagebrush
			Wetland (0 acres)	5-9" Sedges, Tufted hairgrass, Willows
			Wetland (0 acres)	10-14" Sedges, Tufted hairgrass, Willows
			Wetland (0 acres)	15-19" Sedges, Reedgrasses, Tufted hairgrass, Willows

TABLE D1

MAJOR ECOLOGICAL COMMUNITIES AND CORRESPONDING RANGE SITES
(Public, State, and Private Land Inventoried)
(Cont'd)

Ecological Community	Acres ^{1/}	Percent ^{1/} of Area	Corresponding ^{2/} Range Site(s)	Common Species in Climax Communities
Wet Meadow "cont."			Subirrigated (0 acres)	15-19" Rushes, Sedges, Reedgrasses, Slender wheatgrass, Tufted hairgrass, Willows
(7) Salt Bottom	34,400	3	Saline lowland (18,200 acres) Saline/ Subirrigated (200 acres) Saline Lowland (15,900 acres) Saline/ Subirrigated (100 acres)	5-9" Alkali sacaton, Basin wildrye, Blue grama, Rhizomatous wheatgrass, Greasewood 5-9" Alkali sacaton, Cordgrass, Basin wildrye, Alkaligrass 10-14" Alkali sacaton, Basin wildrye, Canada wildrye, Rhizomatous wheatgrass, Greasewood 10-14" Cordgrass, Alkali sacaton, Beardless wildrye, Alkaligrass, Willows
(8) Riparian Shrub/Tree	3,900	1	Lowland (1,300 acres) Lowland (2,300 acres) Subirrigated (0 acres) Clayey/ Overflow (0 acres) Overflow (300 acres) Overflow (0 acres)	5-9" Basin wildrye, Canadian wildrye, Cottonwoods, Needleandthread grass, Slender wheatgrass 10-14" Basin wildrye, Green needlegrass, Rhizomatous wheatgrass, Slender wheatgrass 10-14" Basin wildrye, Slender wheatgrass 10-14" Basin wildrye, Green needlegrass, Rhizomatous wheatgrass 10-14" Basin wildrye, Green needlegrass, Slender wheatgrass, Needleandthread grass, Rhizomatous wheatgrass 15-19" Columbia needlegrass, Idaho fescue, Service berry, Mountain brome, Slender wheatgrass, Chokecherry

TABLE D1

MAJOR ECOLOGICAL COMMUNITIES AND CORRESPONDING RANGE SITES
(Public, State, and Private Land Inventoried)
(Cont'd)

Ecological Community	Acres ^{1/}	Percent of Area	Corresponding ^{2/} Range Site(s)	Common Species in Climax Communities
(9) Desert Shrubland	14,300	1	Very Shallow (0 acres)	5-9" Bluebunch wheatgrass, Indian ricegrass, Big sagebrush, Needleandthread grass, Rhizomatous wheatgrass
			Gravelly (14,300 acres)	5-9" Bluebunch wheatgrass, Indian ricegrass, Needleandthread grass, Big sagebrush
			Coarse Upland (0 acres)	5-9" Bluebunch wheatgrass, Indian ricegrass, Needleandthread grass, Rhizomatous wheatgrass
(10) Foothills Shrub/ Woodland	30,900	3	Gravelly (29,300 acres)	10-14" Bluebunch wheatgrass, Indian ricegrass, Black sagebrush, Needleandthread grass, Rhizomatous wheatgrass
			Coarse Upland (0 acres)	10-14" Bluebunch wheatgrass, Indian ricegrass, Needleandthread grass, Rhizomatous wheatgrass
			Very Shallow (1,600 acres)	10-14" Bluebunch wheatgrass, Needleandthread grass, Prairie junegrass, Black sagebrush
(11) Mountain Shrub/ Woodland	2,300	1	Coarse Upland (0 acres)	15-19" Bluebunch wheatgrass, Columbia needlegrass, Idaho fescue, Prairie junegrass, Spike fescue
			Very Shallow (2,300 acres)	15-19" Bluebunch wheatgrass, Columbia needlegrass, Rhizomatous wheatgrass, Idaho fescue, Mountain muhly, Prairie junegrass
			Shallow Igneous (0 acres)	15-19" Bluebunch wheatgrass, Columbia needlegrass, Black sagebrush, Idaho fescue, Mountain muhly, Rhizomatous wheatgrass

TABLE D1

MAJOR ECOLOGICAL COMMUNITIES AND CORRESPONDING RANGE SITES
(Public, State, and Private Land Inventoried)
(Cont'd)

Ecological Community	Acres ^{1/}	Percent ^{1/} of Area	Corresponding ^{2/} Range Site(s)	Common Species in Climax Communities
Mountain Shrub/ Woodland "cont."			Igneous (0 acres)	15-19" Bluebunch wheatgrass, Idaho fescue, Mountain muhly, Big sagebrush, Prairie junegrass, Rhizomatous wheatgrass, Spike fescue
(12) Barren/Badlands ^{3/}	222,600	18		
Not Inventoried				
Total	1,224,700			

^{1/} Acres and percent of area shown may not correlate directly with Map 2-1. Areas of ecological sites too small to be shown accurately were combined.

^{2/} Ecological site descriptions are available at the Worland District Office. The ecological sites listed represent combinations that have similar species composition but different amounts and/or proportions of species.

^{3/} This community includes primarily the unproductive areas but also includes various range sites which were inventoried but no site description exists, such as woodland, timber, etc.

APPENDIX D

TABLE D2

PRESENT ECOLOGICAL CONDITION, TREND, AND SUITABILITY
PUBLIC, PRIVATE AND STATE LAND AREAS

CATEGORY M

Allotment	Condition (Acres)			Uncl.	Apparent Trend (Acres)			Uncl.	Suitability % Suitable For Livestock
	Good	Fair	Poor		Improving	Static	Declining		
0515	--	482	--	1,154	--	--	--	1,636	58
0519	--	940	864	--	--	242	--	1,562	68
0523	4,469	1,058	95	358	1,079	902	--	3,999	75
0530	70	3,048	148	465	70	2,429	--	1,232	96
0532	33	345	362	171	300	--	--	611	100
0534	384	1,545	4,046	1,001	384	2,005	1,833	2,754	96
0535	2,306	5,630	3,578	2,732	--	4,892	--	9,354	88
0536	1,196	353	--	202	1,196	353	--	202	83
0540	--	895	331	311	--	895	--	642	81
0551	2,043	373	73	158	--	1,425	--	1,222	94
0552	631	63	123	266	--	94	--	989	99
0553	5,155	663	446	335	116	3,000	--	3,483	90
0564	2,227	--	--	239	--	1,485	--	981	97
0569	4,997	2,607	4,705	1,070	--	771	2,481	10,127	89
0572	617	878	23	208	--	598	--	1,128	95
0574	1,604	3,216	1,390	842	--	3,777	346	2,929	93
0582	860	273	171	116	--	693	--	727	93
0585	758	398	201	--	--	132	193	1,032	96
0586	628	--	--	81	--	280	--	429	92
0593	51	425	--	87	--	68	198	297	84
0594	1,206	1,058	--	1,113	--	1,058	--	2,319	82
0595	--	1,406	299	274	--	--	--	1,979	98
0604	34,126	11,874	204	9,279	2,754	26,337	430	25,962	81
0613	603	1,259	--	228	--	1,259	--	831	99
0616	2,464	1,233	234	467	--	875	2,639	884	71
0617	--	37	69	12	69	--	--	49	100
0638	3,453	1,403	--	706	174	2,118	--	3,270	86
0643	1,183	2,068	408	72	--	2,001	--	1,730	96
0644	2,240	3,173	603	1,482	190	1,737	94	5,477	87
0645	1,340	3,782	409	1,151	--	1,397	--	5,285	95
0646	1,246	4,219	139	1,163	1,299	660	416	4,392	71
0647	--	802	1,629	315	--	784	--	1,962	83
0650	--	1,416	472	18	237	693	--	976	99
0657	129	638	217	--	--	577	--	407	100
0661	9,837	1,705	1,265	6,007	120	242	--	18,452	89
0663	3,444	1,337	--	608	1,096	2,129	--	2,164	98
0665	29	4,435	8,137	3,317	--	3,492	279	12,147	73
0672	--	1,640	96	834	--	174	--	2,396	94
0679	34	852	178	410	--	527	--	947	95
2501	120	771	--	--	--	771	--	120	84
2538	1,009	1,081	--	182	--	1,081	--	1,191	97
2555	1,479	2,029	316	--	--	2,752	--	1,135	84
TOTALS	91,971 40%	71,473 31%	31,231 13%	37,434 16%	9,084	74,705	8,909	139,411	87%

TABLE D3

PRESENT CONDITION, TREND, AND SUITABILITY
BY PRECIPITATION ZONES

CATEGORY I

Category I		Condition (Acres)				Apparent Trend (Acres)		Suitability % Suitable For Livestock	
Allotment	Good	Fair	Poor	Uncl.	Improving	Static	Declining	Uncl.	
5"-9"	Acres / %	Acres / %	Acres / %	Acres / %	Acres / %	Acres / %	Acres / %	Acres / %	
0507	754/1	36,054/56	22,982/35	5,165/8	14,550/22	32,299/50	6,011/9	12,095/19	58
0508	12,101/9	86,473/68	12,074/10	16,651/13	4,759/4	97,879/77	879/1	23,691/18	88
0509	38,687/41	19,994/20	6,283/4	31,133/35	7/1	57,851/60	281/1	37,958/38	65
0622	2,698/30	5,747/63	397/4	268/3	1,613/18	6,369/70	--	1,128/12	91
0626	2,608/30	1,061/12	3,086/36	1,865/22	499/6	4,593/53	--	3,528/41	92
0639	5,279/25	10,274/48	333/2	5,450/25	4,769/22	7,336/34	29/1	9,202/43	60
0652	6,913/28	12,526/50	2,393/9	3,211/13	3,294/13	13,988/56	40/1	7,721-30	86
0662	13,945/52	3,391/13	1,582/6	7,757/29	360/2	11,123/42	--	15,192/56	75
0669	8,140/53	3,468/22	862/6	2,954/19	875/6	1,503/10	8,091/52	4,955/32	80
0671	12,905/53	8,048/33	832/3	2,664/11	--	19,636/80	1,877/8	2,936/12	93
1070	7,745/43	405/2	1,718/10	8,011/45	--	8,201/46	294/2	9,384/52	39
TOTAL	111,684/26	187,441/43	52,542/12	85,129/19	30,726/7	260,778/60	17,502/4	127,790/29	78 %

TABLE D3

PRESENT CONDITION, TREND, AND SUITABILITY
BY PRECIPITATION ZONES
(Cont'd)

10" - 14"									
0510	5,180/48	3,354/31	--	2,251/21	2,808/26	4,461/41	--	3,516/33	91
0522	--	5,084/49	3,771/37	1,489/14	--	4,902/47	946/9	4,496/44	94
0524	154/6	1,775/70	192/7	419/17	94/4	--	--	2,446/96	94
0526	2,912/66	251/6	927/19	287/7	--	2,962/68	--	1,415/32	97
0529	5,503/48	3,944/34	121/1	1,913/17	--	1,415/12	897/8	9,187/80	84
0531	--	1,714/88	178/9	63/3	--	178/9	--	1,777/91	77
0537	1,136/23	3,414/71	--	288/6	455/9	2,069/43	785/16	1,529/32	86
0538	1,098/42	357/14	1,036/39	118/5	--	--	1,851/71	758/29	94
0545	--	4,938/82	430/8	626/10	--	2,441/41	--	3,553/59	85
0556	36/2	1,895/81	141/6	260/11	--	222/10	46/2	2,064/88	99
0573	--	2,011/34	3,566/60	349/6	--	3,292/56	546/9	2,088/35	98
0579	5,535/36	6,081/40	3,086/21	507/3	--	8,244/54	--	6,965/46	82
0590	--	1,605/17	5,404/39	2,206/24	514/6	714/8	1,359/15	6,628/71	75
0596	1,121/11	6,259/59	1,621/15	1,550/15	--	1,217/12	1,376/13	7,958/75	83
0605	4,055/8	37,925/76	1,638/3	6,569/13	1,394/3	11,934/24	--	36,859/73	84
0607	695/11	4,068/65	737/12	747/12	--	1,585/25	736/12	3,926/63	95

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TABLE D3

PRESENT CONDITION, TREND, AND SUITABILITY
BY PRECIPITATION ZONESCATEGORY I

Allotment	Good	Condition (Acres)		Uncl.	Improving	Apparent Trend (Acres)		Uncl.	Suitability % Suitable For Livestock
		Fair	Poor			Static	Declining		
	Acres / %	Acres / %	Acres / %	Acres / %	Acres / %	Acres / %	Acres / %	Acres / %	
0609	--	--	3,015/74	1,044/26	--	--	--	4,064/100	61
0614	--	656/41	503/32	437/27	--	80/5	--	1,516/95	97
0627	--	4,849/70	310/5	1,007/16	--	744/12	--	5,422/88	70
0628	153/3	2,931/64	--	1,504/33	--	1,816/40	--	2,772/60	64
0634	4,412/28	6,624/42	1,658/10	3,202/20	632/4	2,955/19	1,124/7	11,185/70	90
0640	5,183/39	3,030/23	1,050/8	4,014/30	--	7,647/58	--	5,630/42	68
0642	4,690/42	4,700/42	283/2	1,629/14	506/4	4,187/37	--	6,609/59	86
0678	1,121/9	10,361/79	518/4	1,101/8	984/8	3,406/26	--	8,711/66	83
1071	1,783/32	3,133/57	--	582/11	--	3,880/71	--	1,618/29	91
2510	--	3,441/89	--	423/11	497/13	1,273/33	--	2,094/54	91
TOTAL	44,767/19	124,400/53	30,185/15	34,585/15	7,884/3	71,624/31	9,648/4	144,768/62	85 %

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TABLE D3

PRESENT CONDITION, TREND, AND SUITABILITY
BY PRECIPITATION ZONES
(Cont'd)

15" - 19"									
0516	--	1,824/45	1,049/25	1,211/30	--	--	--	4,084/100	93
0525	--	367/10	2,247/64	925/26	--	--	--	3,539/100	81
0541	--	302/19	--	1,304/81	--	--	--	1,606/100	56
0542	--	--	2,543/78	710/22	--	--	--	3,253/100	91
0558	230/19	638/53	--	335/28	--	--	--	1,203/100	94
0560	--	--	540/31	1,219/69	--	--	--	1,759/100	14
0568	--	9,117/52	3,952/23	4,308/25	--	--	--	17,377/100	74
0575	--	149/4	2,859/81	548/15	--	--	--	3,556/100	78
0606	99/1	29,670/68	3,749/8	9,791/23	425/1	2,457/6	--	40,427/93	79
0615	--	--	1,574/63	914/37	--	--	--	2,488/100	78
0620	1,269/16	5,316/69	--	1,147/15	--	899/12	183/2	6,650/86	75
0621	254/8	2,809/91	--	29/1	374/12	609/20	--	2,109/68	66
0633	--	8,954/82	--	2,009/18	--	777/7	--	10,186/93	97
0635	--	454/29	127/8	991/63	--	--	--	1,572/100	41
0637	--	2,885/47	3,040/49	275/4	--	1,070/17	--	5,130/83	88
0681	--	3,155/78	78/2	797/20	--	--	--	4,030/100	69
TOTAL	1,852/1	65,640/57	21,758/19	26,513/22	799/1	5,812/5	183/1	108,969/93	80 %
TOTAL I	157,182/20	367,120/48	103,967/13	145,131/19	38,425/5	334,808/43	27,333/4	372,834/48	81 %

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TABLE D4

PRESENT CONDITION, TREND, AND SUITABILITY

CATEGORY C₁

Allotment	Condition (Acres)			Uncl.	Apparent Trend (Acres)			Uncl.	Suitability % Suitable For Livestock	
	Good	Fair	Poor		Improving	Static	Declining			
0504	2,418	5,487	2,656	1,565	47	5,484	--	6,595	91	
0506	319	384	262	273	--	180	--	1,058	93	
0512	5,227	4,643	35	2,562	4,414	5,392	64	2,597	84	
0521	--	--	6,779	708	--	5	1,520	5,962	39	
0527	382	303	--	206	56	627	--	208	76	
0528	484	1,258	162	--	--	1,940	--	--	100	
0533	208	804	--	21	--	739	--	294	97	
0539	794	--	1,067	--	--	1,829	--	32	96	
0543	1,283	--	271	154	--	223	1,281	203	44	
0546	--	368	616	239	--	203	323	697	86	
0548	96	277	1,204	141	--	1,085	96	537	68	
0554	1,340	204	990	71	--	1,406	297	902	89	
0559	2,277	1,512	136	899	--	1,512	2,277	1,035	83	
0561	474	3,621	20	762	1,590	--	--	3,287	95	
0566	24	1,162	808	359	--	600	--	1,753	86	
0567	--	2,130	--	318	--	1,336	--	1,112	89	
0576	2,705	965	2,607	2,718	152	965	2,705	5,173	25	
0577	8,373	357	1,843	3,151	90	9,936	273	3,425	74	

TABLE D2
PRESENT CONDITION, TREND, AND SUITABILITY

Allotment	CATEGORY C ₁				Apparent Trend (Acres)			Suitability % Suitable For Livestock	
	Condition (Acres)				Improving	Static	Declining	Uncl.	
	Good	Fair	Poor	Uncl.					
0578	2,127	1,648	1,004	984	1,006	1,194	2,570	993	66
0580	--	87	878	188	--	--	--	1,083	85
0588	388	478	205	279	--	737	89	474	28
0597	--	608	2,498	710	--	--	--	3,816	77
0608	520	376	378	--	49	110	301	814	96
0610	--	680	312	186	9	184	--	985	95
0612	1,868	1,094	--	246	41	2,690	--	477	42
0619	7,858	8,141	110	4,366	--	16,063	1	4,411	17
0623	6,553	226	27	1,367	--	6,277	--	1,896	77
0636	--	--	539	--	--	98	375	66	87
0641	--	19	1,050	14	--	381	558	144	98
0648	--	558	--	99	123	--	204	330	97
0651	23,483	6,356	2,337	7,290	4,765	6,356	18,718	9,627	83
0653	196	680	--	306	98	260	--	824	99
0654	679	1,202	--	23	636	566	--	702	87
0664	--	468	75	68	--	183	285	143	39
0674	5,177	2,443	451	2,834	--	1,887	4,949	4,069	75
Total	75,202 (40%)	48,539 (26%)	29,320 (16%)	33,040 (18%)	13,076	70,414	36,887	65,724	78 %

TABLE D4

PRESENT CONDITION, TREND, AND SUITABILITY
(Cont'd)CATEGORY C₂

Allotment	Condition (Acres)			Uncl.	Apparent Trend (Acres)			Uncl.	Suitability % Suitable For Livestock
	Good	Fair	Poor		Improving	Static	Declining		
0513	59	461	--	277	--	21	--	776	76
0528	484	1,258	162	--	--	1,904	--	--	100
0544	54	--	56	22	--	46	54	32	9
0549	--	268	118	85	198	11	118	144	0
0557	--	123	143	34	--	155	10	135	81
0618	95	431	--	267	--	526	--	267	99
0668	6,288	2,421	339	1,078	--	8,820	--	1,306	14
1077	4	131	4	--	--	4	135	--	97
Total	6,984 (48%)	5,093 (34%)	822 (6%)	1,763 (12%)	198	11,487	317	2,660	50 %

TABLE D5
SUMMARY PRESENT CONDITION, TREND, AND SUITABILITY FOR EACH CATEGORY

Totals by Category	Condition (Acres)					Apparent Trend (Acres)		Suitability % Suitable For Livestock	
	Good	Fair	Poor	Uncl.	Improving	Static	Declining	Uncl.	
	Acres / %	Acres / %	Acres / %	Acres / %					
"M"	91,971	71,410	31,231	37,434	9,084	74,705	8,909	139,411	87
"I"	158,394	377,481	104,485	146,227	38,214	338,214	27,351	381,545	81
"C 1"	75,253	48,539	29,320	33,107	70,448	70,448	36,886	65,724	78
"C 2"	6,984	5,093	822	1,763	11,487	11,487	317	2,660	50
GRAND									
TOTALS	332,602/27	502,523/41	165,858/14	218,531/18	61,767	494,854	73,463	589,340	82 %

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TABLE D6

RANGE SUITABILITY CRITERIA - CATTLE

1. Forage production potential is less than 32 acres/AUM
(25#/acre) U
1. Forage production potential is more than 32 acres/AUM
(25#/acre) (See #2)
2. Present forage production is less than
32 acres/AUM PS or U
2. Present forage production is more than
32 acres/AUM (See #3)
3. Area is inaccessible under present
management practices PS or U
3. Area is accessible under present
management practices (See #4)
4. Slopes more than 50% U
4. Slopes less than 50% (See #5)
5. Slopes 41 - 50% (See #8)
6. Distance to water more
than 0.3 miles PS or U
6. Distance to water less
than 0.3 miles S
5. Slopes 30-40% (See #8)
7. Distance to water more
than 0.4 miles PS or U
7. Distance to water less
than 0.4 miles S
5. Slopes 21 - 30% (See #8)
8. Distance to water more than
0.6 miles PS or U
8. Distance to water less than
0.6 miles S
5. Slopes 0 - 20% (See #8)
9. Distance to water is more
than 4 miles PS or U
9. Distance to water is less
than 4 miles S

"U" designates unsuitable, "P" designates potentially suitable, and "S" designates suitable.

APPENDIX D

METHODOLOGY FOR VEGETATION AND FORAGE ALLOCATION (FOR ALTERNATIVE 4)

DETERMINATION OF RANGE CONDITION, AND 20-YEAR CONDITION AND PRODUCTION PREDICTIONS

Methodology For Vegetation Inventory And Forage Allocation

An inventory of the Grass Creek Resource Area was conducted from June 1977 to October 1979 and collected data that was used to calculate the average annual forage production to be allocated among livestock and wildlife. Inventory methods are described in BLM Manual 4412.14, Soil Vegetation Inventory Method (SVIM) and in BLM Manual 6602, Integrated Habitat Inventory and Classification System. These manuals, study data, maps, and references from the inventory and forage allocation process are available for inspection at the Grass Creek Area Office, BLM Worland District.

The vegetation inventory was based on soil surveys conducted by SCS or BLM soil scientists according to SCS standards (see Chapter 2, Soils). The soil surveys assigned each mapping unit to a range site served as the basis for estimating range condition (U.S. Department of Agriculture National Range Handbook, 1976). A field survey to estimate range conditions was conducted from fall 1977 to summer 1979. Range condition and existing vegetation was mapped for each allotment so that each allotment was divided into geographic units, each consisting of a range site (or a complex of range sites) in a single condition class. Each of these geographical units is called a Site Writeup Area (SWA). Within each allotment, vegetation transects were laid out to sample each range site and condition class; each transect was within a single SWA. The transects (described in the SVIM manual) each consists of 200 step points (to determine ground cover) and ten to twenty weight estimate or clip plots. Enough plots were done on each transect to obtain 20 percent precision with 80 percent confidence. That is, for 80 percent of our transects, the average weight of vegetation in the plots should be within 20 percent of the true average weight for the SWA. The data were processed by the Bureau of Land Management, Denver Service Center. Data from weight plots were adjusted to maximum production for the season using data from a SVIM phenology study conducted in 1978 and 1979. The production figures were further adjusted to reflect the conditions of a year with average conditions for plant growth by using a climate adjustment factor based on precipitation and production data collect-

ed at study enclosures in the Big Horn Basin by the University of Wyoming from 1962 to 1979. The forage production was allocated among livestock and wildlife using a linear program computer model to process the SVIM data (SVIM Forage Allocation Users Manual). The forage allocation model maximized the use of forage available for grazing, subject to proper use factor constraints, plant maintenance or allowable use factor constraints, dietary constraints, animal numbers, and management constraints.

An allowable use factor (AUF) for each type of grazing animal was applied to the production of each plant species to arrive at the total pounds of herbage and the percent of the plant that could be removed by grazing animals without affecting the viability of the plant. The AUFs were weighted to the season of use as follows: Spring - March 21 through June 20, Summer - June 21 through September 20, Fall - September 21 through December 20, Winter - December 21 through March 20. In addition, proper use factors (PUFs) were applied to each plant. Proper use factors include the amount of herbage that can be removed without damaging the plant and the preference of the grazing animal for that particular species. PUFs vary with the season of use because plant defoliation anytime during the growing period is harmful to the plant. Also, production figures are based on mature dry weights. PUFs did not exceed 50 percent of the current year's growth. PUFs used in the determination of forage allocation were obtained from PUF tables prepared by the Worland BLM office.

Objective wildlife numbers were used in the forage allocation process. Upper limits on cattle numbers were left open so that no animal species was given priority over any other species in the forage allocation process.

The amount of forage required by various animals for one month is cattle 780, horses 900, mule deer 103, antelope 74, sheep 150, elk 274, moose 674, and bighorn sheep 116.

These figures were used in the forage allocation process to determine total forage consumed for each allotment.

The percent of suitable, potentially suitable, and unsuitable land for each SWA was also entered

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into the forage allocation model. Suitable land criteria were only established for livestock. Criteria have not been established for wildlife at this time. The criteria were based on distance from water, slope, and production. Those SWAs with a production of 25 lbs./ac. or less (32 acres/AUM) were considered potentially suitable due to low production. For a detailed explanation of the forage allocation model and process and the relationship of the above variables, see Martinson and MacPherson (1979b).

Consumptive and nonconsumptive forage was obtained from the forage allocation process. Consumptive forage is the amount of forage consumed by herbivores. Nonconsumptive forage is forage not used by herbivores; it includes forage needed by the plant for reproduction and physiology, as well as noxious plants.

Other information received from the forage allocation process was optimal animal mixture, acres per animal unit, and animal unit months for each SWA and for each allotment. This information was used to analyze and determine the environmental consequences of the proposed action and alternatives.

Determination of Range Condition

Range condition is the present state of vegetation of a range site in relation to the climax (potential natural) plant community for that site. It is an expression of the relative degree to which the kinds, proportions, and amounts of plants in a plant community is basically an ecological rating of the plant community (U.S. Department of Agriculture, 1976).

For the purpose of inventory, a range site in a corresponding condition class (i.e., sampling stratum) provided a reasonably consistent plant community from which data could be collected and to which data could be extrapolated. For management, this method of grouping vegetation can:

"...provide a basis for predicting the extent and direction of changes that can result in the plant community because of specific treatment or management." (U.S. Department of Agriculture, 1976).

In the field, the present plant community was compared to the climax plant community as described in the range condition guide for the range site. For the existing plant community, the maximum percentage of total production shown for each plant species in the range site guide was the maximum percentage that was counted for a condition rating. The percentages were totaled to indicate the

relative ecological rating or numerical evaluation of the stand. The ratings could fall between 0 and 100, depending on how closely the plant community resembled the climax plant community for the range site.

Four classes were used to express the degree to which the composition of the present plant community reflected that of the climax. Range sites with excellent condition class had 76-100 percent of plant community in climax, sites in good condition class had 51-75 percent, sites in fair condition had 26-50 percent, and sites in poor condition had 0-25 percent of their plant community in climax.

Projected Condition And Production

Ecological Condition Prediction

The estimates are based on what the condition would be after a 20-year time period. The basic assumption is that implementation of an intensive range management program including utilization level adjustments, grazing systems, and range improvement on Category "I" allotments would provide for improvement by one condition class. The poor would be improved to fair and fair to good condition. A small portion of the good condition could be improved to excellent condition. It is questionable if most areas have the potential within the time period to reach excellent condition.

It is assumed that the "M" and "C" category allotments which would not receive intensive management would maintain their present conditions or improve slightly depending on actions initiated by the permittees.

Projected acreages in each condition class have been listed for the proposed action and each alternative (Table 1).

Vegetation Production Prediction

Production predictions were based on a 20-year time period and a quantitative analysis to determine increased usable production due to land treatment, grazing systems, and condition changes.

Land Treatment

Various areas within the resource area have been treated in the past. The inventory data was used to compare the production for a treated range site with the same range site untreated. For exam-

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ple, a treatment on loamy and sandy sites with 5 to 9 inches of precipitation could increase forage production from 250 lbs. to 400 lbs. and change carrying capacity from 22 would increase from 45 to 77.

Grazing System

Grazing systems could increase forage production by an average of 10 percent.

Condition Changes

As range condition improves, the productivity also increases (see SCS Technical Guide). The increase varies by precipitation zone and range site and by condition change. An average of 50 percent increase in production is expected for condition class changes.

Highlights of the literature that was used as a basis for the assumptions in the methodology for determining range condition and production follows.

LITERATURE REFERENCES AND HIGHLIGHTS

UTILIZATION LIMITS

Cook, C. Wayne - Effects of Season and Intensity of Use on Desert Vegetation (1971). "50 percent defoliation was considered too severe for continuous late spring or summer grazing." 25 percent if grazed in spring, May 1 - July 1 - most detrimental to carbohydrate reserves. 75 percent too severe to all species and seasons. 60 percent too severe for winter but 50 percent ok.

Laycock, W.A. - Management of Sagebrush (Oct. 1979) "With cattle any rest rotation or similar system that puts heavy pressure on herbaceous plants, even one year out of three or four will tend to favor the sagebrush."

Thilenius, John F. - Alpine Range Management, USDA Research Paper RM-157,75 "20 to 30 percent of removal of major species appears to be a reasonable range of allowable uses."

Currie, Pat O. - Grazing Management of Ponderosa Pine-Bluegrass Ranges of the Central Rocky Mountains - USDA RM-158. "Recommend 30-40 percent use", 50 percent subjects soils to accelerated erosion.

Paulson, Jr., Harold A. - Range Management in Central and Southern Rocky Mountains. "30-40 percent Utilization Recommendation"

Fisser, H.G., and R.E. Steger - Winter Sheep Grazing Study on Saltbush Pond, Rangeland (1988). Study shows that optimum winter use of saltbush in the Big Horn Basin of Wyoming should be set at no more than 35 percent of total minimal production available at the time of grazing.

Floyd, W. - Vigor of Idaho Fescue in Relation to Different Grazing Buwal, Intensities. Less than 25 percent use in summer - 50 percent by cattle in summer lowers the vigor of plants.

Buwal, M., and Trlica, M.J. 1977 - Multiple Defoliation Effects on Herbage Yield, Vigor, and Total nonstructural carbohydrates of the Five Range Species.

J. of Range Management 30(3): 164-171. "Defoliation of plants during susceptible periods can reduce the ability to maintain growth and vigor."

Garrison, G.A. (1972) - Carbohydrate Reserves and Response to Use, Ogden, Utah: Forest Service, USDA. Winter use results in least plant damage.

Trlica, M.J., and C.W. Cook. 1971. - Defoliation Effects on Carbohydrates Reserves of Desert Species. J. of Range Management 24(6): 418-425. Most shrubs defoliated by clipping May 1 or July 1, had smaller food reserves than unclipped plant. Several authors (Johnson 1965; Hormay and Talbot 1961; Stoddart et al. 1975) point out heavier livestock utilization is possible with well-designated grazing systems. Heady (1952) reports that "an average utilization of the key species over a number of years which approximates 50 percent is a reasonable expression of proper use for most grassland ranges."

Hormay, August L. (1970) - How Livestock Grazing Habits and Growth Requirements of Range Plants Determine Sound Grazing Management. Selective grazing of the vegetation is the prime course of range deteriorations: its harmful effects can be overcome by resting the range from grazing at intervals to meet key forage species requirements.

Dregne, H.E. 1978 - Desertification: Man's abuse of the land. J. Soil Water Conserv. 33(1): 11-14 Overgrazing has caused 70 percent of western grazing lands to produce less than 50 percent of their forage potential.

Grazing Management

Hormay, A.L., and A.D. Evanko (1958). Rest-Rotation Grazing - A Management System for Bunchgrass/Ranges. USDA Forest Service California Forest and Range Experimental Station Miscellaneous Paper No. 27. Heavy use and long seasons of use lead to progressively enlarging areas of range deteriorations.

Parker, K.W. (1954). - Application of Ecology in the Determination of Range Condition and Trend. Journal of Range Management, Vol. 7, No. 1, pp. 14-23. Before improvement to range condition occurs, plant vigor must be restored.

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Gibbens, R.P., and Fisser, H.G. (1975). *Influence of Grazing Management Systems on Vegetation in the Red Desert Region of Wyoming*. Laramie: University of Wyoming. "Showed deferred-rotation system increased grasses and forbs by 6 percent."

Riparian

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Marcuson, Patrick E. (1977). The Effect of Cattle Grazing on Brown Trout in Rock Creek, Montana. Spec. Rep. Proj. No.

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F-20-R-21, II-a, 26p. Mont. Dept. of Fish & Game, Fish Div. Behnke (1977) predicted little or no vegetation improvement in this ecological community if season-long deferred, or rest rotation grazing management strategies were adopted.

Ames (1977) reported on an area that has riparian vegetation similar to GCRA "...that there is no known system of livestock management that will give adequate protection to a riparian zone."

Hughes, L.E. (1978). Rest-Rotation Grazing Vs. Season-Long Grazing on Naval Oil Shale reserve allotments in Colorado. Abstract of Papers, 31st Annual Meeting, Society for Range

Management, San Antonio, Texas. Denver, Colorado: Soc. for Range Management revealed that perennial grasses on streambanks and wash bottoms are about three times as dense under rest-rotation grazing as under season long grazing. Woody riparian vegetation, however, responds little if at all to rest-rotation grazing.

Meyers, Lewis H. (1981) Impacts of Livestock Grazing Systems on Riparian Habitats in Southwestern Montana Bureau of Land Management. 'Grazing systems lacking hot season use, or with no more than one hot season treatment in four years, met riparian habitat management goals on 90 percent of 20 streams evaluated.'

APPENDIX E

SOILS

TABLE E-1 Soil Map Units, Soil Series Included, and Their Properties

TABLE E-2 Soil Map Units, Unit Group Numbers, and Acreages

TABLE E-3 Sediment Yields and Vegetative Cover Changes for "I" Category Allotments

TABLE E-4 U.S.D.I. BLM Sediment Yield Factor Rating Form 7310-16

TABLE E-5 PSIAC Land Use Factor Values by Percent Poor and Fair Range Condition

TABLE E-6 Change Values in Total Erosion Factor by Change in Runoff, Ground Cover, and Land Use Factors

FIGURE E-1 Relationship Between PSIAC Sediment Yield Rating Factor and Estimated Sediment Yield

APPENDIX E

Appendix E contains discussions, explanations, and background information about the Soils portions of Chapters 2 and 3.

Table E-1 lists the general soil map units that are delineated on the General Soils Map, Figure 2-2. This table includes the major soil series in each unit and relevant properties of each series.

Table E-2 lists the general soil map units, the acreages of public and other status lands they occupy, and the group numbers, 1 of 4, in which they fall, as in Figure 2-3.

Table E-3 shows sediment yield rates and totals, and percent vegetative cover change for the existing environment and Proposed Action.

The PSIAC Sediment Yield Methodology section describes how sediment yield rates and totals were estimated using the Pacific Southwest Interagency Committee data sheet, equation, and graph.

Table E-4 is the official BLM PSIAC form 7310-16.

Figure E-1 is the graph relating values from the PSIAC equation to sediment yield rates in acre feet per square mile per year.

Table E-5 shows the relationship between percentages of acreages per allotment in poor to fair condition and PSIAC ratings for the runoff factor.

Table E-6 shows the relationship between the sum of changes in the runoff, ground cover, and land use factors and the resulting change in the total erosion factor in the PSIAC equation with the proposed action.

The section on Methodology for Estimating Future Sediment Yield Rates and Totals for All Alternatives also explains figures in Table 3-6, where a proportionality based on the poor/fair acreage and sediment yield rate of the proposed action are used to determine rates for the alternatives.

The section on Methodology for Estimating Future Vegetation Cover for the Alternatives explains figures on Table 3-6, where a proportionality based on the good/excellent acreage and vegetative cover percent of the proposed action are used to determine vegetative cover percent for the alternatives.

PSIAC SEDIMENT YIELD METHODOLOGY

Sediment yields were determined by correlating data from the Soil Vegetation Inventory Method (SVIM) conducted during 1978-1979 and BLM planning documents to the Pacific Southwest Interagency Committee's (PSIAC) Sediment Yield Rat-

ings (see Table E-4, BLM form 7310-16). Each factor in the PSIAC rating procedure was estimated on an average basis by allotment. The factor ratings were added to give a total sediment yield rating. This value was applied to the PSIAC graph (see Figure E-1) to find the quantity of sediment yield in acre feet per square mile per year. Sediment yield increases with yield rating. Explanations for specific rating procedures of PSIAC factors are available at the Worland District Office.

METHODOLOGY FOR ESTIMATING FUTURE PSIAC FACTORS FOR THE PROPOSED ACTION

Implementation of the proposed action would lower the ratings for the runoff, ground cover, land use, and upland and channel erosion factors in the PSIAC equation. For example, the proposed grazing adjustments would increase ground cover and lower the rating for that factor.

Runoff

Changes in the runoff factor were based on the proportions of acreage improving from poor to fair and from fair to good range condition class. The runoff factor would be lower because increases in vegetative and litter and cover would lessen water flow on the soil surface. Therefore, a shift of 55 percent or more from poor to fair would mean a factor decrease of 2, and a shift of 30 percent or more a decrease of 1. For a shift of 40 percent or more from fair to good the decrease in runoff factor would be 1.

Ground Cover

For each allotment we have calculated the weighted total cover and total vegetative cover. Percent total cover determines the PSIAC factor for ground cover.

Changes in the PSIAC ground cover factor are based on proposed changes in vegetative cover. Proposed changes in grazing management would increase ground cover to the percent levels given for range sites in good to excellent condition class (see SCS Tech Guides). The "I" category allotments where cover percents could increase are listed on Table E-3. (Some range sites, for exam-

APPENDIX E

ple, timbered land and rock outcrop, are unclassified or considered unsuitable in the SCS technical guides. Thus, these range sites are not in consideration for vegetative cover improvement.) On those range sites with cover deficiencies, proposed increases in vegetative cover generally would cause equivalent increases in total cover. These total cover increases, when added to the cover averages for each allotment, give proposed weighted averages of total cover. This adjusted figure for total cover determines the new PSIAC factor for ground cover, according to Table E-4.

Land Use

Land use intensity was based on acreages of grazing land in fair or poor condition as a proportion of total acreage. We based land use factors for the proposed action on the proportion of acreage remaining in fair and poor condition after proposed improvements in range condition class. For example, in an allotment having 68 percent fair and 10 percent poor, acreages in each category would be improved one condition class. This would leave 10 percent in poor and fair condition. In this case, the land use factor would change from 6 for existing environment to -8 for proposed action. Refer to Table E-5 for land use factor ratings.

Upland and Channel Erosion

The upland and channel erosion factor is proportional to other PSIAC factors (see Table E-4, Sediment Yield Factor Rating). Runoff, ground cover, and land use factors are changeable with grazing treatments and they affect sediment yield estimates, unlike constant factors like geology and topography. We calculated sums of these three factors for each "I" allotment. Then, using all absolute values, we added the proposed changes in these factors to the sums of present factors. The magnitude of the final values indicated the relative changes for various allotments, by giving more weight to changes on allotments with the highest (worst condition) existing PSIAC values. For example, in Allotment A, the the present factor total, 12, plus the change total, 13, equals 25. In Allotment B, $3 + 13 = 16$. The resulting numbers, 25 or 16, were applied to Table E-6 to get changes in the erosion factor. The new factor values were then used on the rating form, Table E-4, along with the unchanged factors.

The new equation values then were applied to the graph in Figure E-1. In Allotment A, the total of

changes in runoff, ground cover, and land use would cause a greater proportional decrease in erosion rate because of the higher initial rate, than in Allotment B. This relationship compensates for the trend on the graph, where sediment yield rates change logarithmically as factors change. For example, the rate difference between factors 10 and 20 is .035, and between 70 and 80 is 0.45.

METHODOLOGY FOR ESTIMATING FUTURE SEDIMENT YIELD RATES AND TOTALS FOR ALL ALTERNATIVES

This appendix is an explanation of sediment yield estimates presented on Table 3-6.

We based these determinations on changes in the proposed action, which we could estimate with the PSIAC Methodology. Using PSIAC methodology, we calculated individual sediment yield rates and a weighted average rate for sediment yields on "I" category allotments, 1.15 ac.ft. per square mile per year. We estimated sediment yield rates for "C" and "M" category allotments, 1.3 and 0.85 ac.ft. per square mile per year, respectively, based on range condition and erodibility class. Total sediment yield was added for "I" allotments and calculated for "M" and "C" as the product of rate per square mile and total square miles. We then found the weighted average rate for the existing environment (see Table 3-6).

Proposed changes in land use intensity and vegetative cover in the "I" allotments altered PSIAC factor values for runoff, ground cover, land use, and total erosion, primarily in "I" allotments. Thus, new sediment yield rates were estimated. The proposed action would have no major changes in "M" and "C" allotments, so we calculated a new weighted average rate for "I" allotments, 0.60, and with the "M" and "C" allotment rates, 0.85 and 1.20, estimated the new rate (see Table 3-6).

We assumed that sediment yields for each alternative resulting from grazing were related to total acreages in fair and poor range condition classes. Thus, total sediment yields (X) could be estimated by proportionality, e.g., $1,400/503,000 = X/923,000$ where 1,400 is the present sediment yield in acre feet per year, 503,000 is the proposed action acreage in fair to poor condition, and 923,000 is the Alternative "I" acreage in that condition. We calculated average sediment yield rates for the alternatives from yields divided by total areas.

APPENDIX E

METHODOLOGY FOR ESTIMATING FUTURE VEGETATIVE COVER FOR THE ALTERNATIVES

This appendix is an explanation of vegetative cover estimates presented in Table 3-6.

We determined the weighted average vegetative cover for "I" allotments based on SVIM data, and combined that figure with estimated cover of "M" and "C" allotments to obtain a weighted average vegetative cover for all allotments in the existing environment. Weighting was based on acreages. We estimated optimal vegetative cover by range site in "I" allotments for good to excellent condition (SCS Technical Guide), and assumed that existing vegetative cover would be brought to optimal levels by the proposed action. The vegetative cover percent for the proposed action is the average optimal cover figure for "I" allotments, combined with the unchanged "M" allotment figure and the estimated new figure for "C" allotments arising from small use adjustments in the proposed action.

Future vegetative cover estimates (X) for each alternative are based on the proportions of acreages in good to excellent condition. They were calculated by proportionality compared with figures for the proposed action, as in the example for sediment yields, e.g., $27/617,000 = X/298,000$ where 27 is percent vegetative cover, 617,000 is the proposed action acreage in good to excellent condition, and 298,000 is Alternative 1 acreage in the same condition.

TABLE E-1

SOIL MAP UNITS, SOIL SERIES INCLUDED AND THEIR PROPERTIES

Soil (Map Unit)	Associated Soil Series	Percent Slope	Surf. Perm. 1/ in/hr.	A.W.C. 2/ Profile	pH 3/	E.C. 4/ K 5/	Erosion Soil Loss Hazard Tolerance T 6/	Hyd. Soil Grp 7/	Soil Depth In.	Range Site 8/	Prod. # lbs. Norm 9/	Precip. Zone	Construction Limitation 10/	
F1 M1 2	(See associated soil series Brownstone, Alcoa and Patent). (See associated soil series Lostwells, Youngston, Binton and Offens).													
	Rock-outcrop Shingle	3-60 3-60	NOT APPLICABLE .6-2.0	4.8	7.4-8.4	2	.24	2T/Ac.	C	20	Shallow Loamy	900#	10-14	Thin Layer Thin Strength
	Tassel	3-60	2.0-6.0	2.25	7.4-8.4	2	.24	1T/Ac.	D	20	Shallow Sandy	350#	10-14	Thin Layer Seepage
	Thedlund	3-60	.6-2.0	4.5	7.9-8.4	8	.32	2T/Ac.	D	40	Loamy	800#	10-14	Reclaim Shrink Swell
	Stoneham	3-60	.6-2.0	8.4	6.6-7.8	-	.20	5T/Ac.	D	60	Loamy	800#	10-14	Shrink Swell Piping
	Kim	3-60	.6-2.0	9.0	7.9-8.4	2	.32	5T/Ac.	B	60	Loamy	800#	10-14	Low Strength Shrink Swell
	Travessilla	3-60	.6-2.0	1.0	7.4-8.9	2	.32	1T/Ac.	D	20	Shallow Loamy	350#	10-14	Thin Layer
	Nihill Shingle	3-45 3-45	0.6-2.0 0.6-2.0	6.0 4.8	7.4-7.8 7.4-8.4	- 2	.24 .24	2T/Ac 2T/Ac	B C	60 20	Gravelly Shallow Loamy	300# 900#	10-14 10-14	Seepage Thin Layer Low Strength
3	Shingle	3-60	.6-2.0	4.8	7.4-8.4	2	.24	2T/Ac.	C	20	Shallow Loamy	900#	10-14	Thin Layer Low Strength
	Rock-outcrop Samfil	3-60	NOT APPLICABLE .06-0.2	1.7	7.4-8.4	-	.28	2T/Ac.	C	20	Shallow Clayey	300#	10-14	Thin Layer Weak Soil
4	Rock-outcrop Travessilla	3-60	NOT APPLICABLE .6-2.0	1.0	7.4-8.9	2	.32	1T/Ac.	D	20	Shallow Loamy	350#	10-14	Thin Layer
	Speartfish	3-60	.6-2.0	2.8	6.6-8.4	2	.32	1T/Ac.	B	20	Shallow Loamy	550#	10-14	Thin Layer Piping
	Neville	3-60	.6-2.0	9.0	7.4-8.4	2	.28	5T/Ac.	B	60	Loamy	1000#	10-14	Piping
	Tensleep	3-60	.6-2.0	9.4	6.6-7.3	2	.43	5T/Ac.	B	60	Loamy	800#	10-14	Piping
5	Rekop	3-60	0.6-2.0	2.24	7.9-9.0	2-4	.37	1T/Ac.	D	20	Shallow Loamy	350#	10-14	Thin Layer Piping
	Gystrum	3-60	.6-2.0	5.4	7.4-8.4	2-4	.43	2T/Ac.	C	40	Loamy	700#	10-14	Piping Seepage
	Speartfish	3-60	.6-2.0	2.8	6.6-8.4	2	.32	1T/Ac.	B	20	Shallow	550#	10-14	Thin Layer

TABLE E-1

SOIL MAP UNITS, SOIL SERIES INCLUDED AND THEIR PROPERTIES
(Continued)

Soil Unit	Associated Soil Series	Percent Slope	Surf. Perm. 1/ in/hr.	A.W.C. 2/ Profile	pH 3/	E.C. 4/	Erosion Hazard K 5/	Soil Loss Tolerance T 6/	Hyd. Soil Grp 7/	Soil Depth In.	Range Site 8/	Prod. # lbs. Norm 9/	Precip. Zone	Construction Limitation 10/
	Neville	3-60	.6-2.0	9.0	7.4-8.4	2	.28	5T/Ac.	B	60	Loamy	1000#	10-14	Piping
	Rock-outcrop Travessilla	3-60	NOT APPLICABLE .6-2.0	1.0	7.4-8.9	2	.32	1T/Ac.	D	20	Shallow Loamy	350#	10-14	Thin Layer
6	Rock-outcrop Shingle	3-60	NOT APPLICABLE .6-2.0	4.8	7.4-8.4	2	.24	2T/Ac	C	20	Shallow Loamy	900#	10-14	Thin Layer Low Strength
	Tassle	3-60	2.0-6.0	2.25	7.4-8.4	2	.24	1T/Ac	D	20	Shallow Sandy	350#	10-14	Thin Layer Seepage
	Epsie	3-60	0.06	2.1	7.9-8.9	4	.32	3T/Ac	D	40	Saline Upland	300#	10-14	Weak Soil Thin Layer
	Oceanet	3-60	2.0-6.0	1.4	7.9-9.0	2	.24	1T/Ac	D	20	Shallow Sandy	375#	5-9	Thin Layer Seepage
	Persayo	3-60	0.2-0.6	2.2	7.9-9.0	8	.37	1T/Ac	D	20	Saline Upland	350#	5-9	Thin Layer Piping
7	Orella	3-60	.06-9.2	1.8	7.9-9.0	-	.49	1T/Ac	D	20	Saline Upland	300#	10-14	Thin Layer Weak Soil
	Cadoma	3-60	.06-0.2	4.3	7.9	4	.32	3T/Ac	D	40	Saline Upland	600#	10-14	Low Strength Reclaim
	Kim	3-60	.6-2.0	9.0	7.9-8.4	2	.32	5T/Ac	B	60	Loamy	800#	10-14	Low Strength Shrink-Swell
	Petrie	3-45	.06-0.2	9.6	8	2-4	.49	5T/Ac	D	60	Saline Upland	600#	10-14	Low Strength Shrink-Swell
	Arvada	3-45	2.0-6.0	5.9	7.4-9.0	4	.32	5T/Ac	D	60	Saline Upland	500#	10-14	Piping Shrink-Swell
	Kim-wikali	3-45	.6-2.0	9.6	7.9-9.0	4-8	.32	5T/Ac	B	60	Saline	900#	10-14	Piping
8	Shingle	3-60	.6-2.0	4.8	7.4-8.4	2	.24	2T/Ac	C	20	Shallow Loamy	900#	10-14	Thin Layer Low Strength
	Rock-outcrop Thedlund	3-60	NOT APPLICABLE .6-2.0	4.5	7.9-8.4	8	.32	2T/Ac	D	40	Loamy Shallow	800#	10-14	Seepage Reclaim
	Tassel	3-60	2.0-6.0	2.25	7.4-8.4	2	.24	1T/Ac	D	20	Sandy	350#	10-14	Thin Layer Seepage
	Larimer	3-60	2.0-6.0	5.9	6.6-7.9	-	.24	3T/Ac	B	60	Loamy	800#	10-14	Severe Seepage

TABLE E-1

SOIL MAP UNITS, SOIL SERIES INCLUDED AND THEIR PROPERTIES
(Continued)

Soil (Map) Unit	Associated Soil Series	Percent Slope	Surf. Perm. 1/ in/hr.	A.W.C. 2/ Profile	pH 3/	E.C. 4/	Erosion Hazard K 5/	Soil Loss Tolerance T 6/	Hyd. Soil Grp 7/	Soil Depth In.	Range Site 8/	Prod. # lbs. Norm 9/	Precip. Zone	Construction Limitation 10/
	Arvada	3-60	2.0-6.0	5.9	7.4-9.0	4	.32	5T/Ac	D	60	Saline Upland	500#	10-14	Piping Shrink-Swell
	Kim Alkali	0-10	0.6-2.0	9.6	7.9-9.0	4-8	.32	5T/Ac	B	60	Saline Lowland	900#	10-14	Piping Shrink-Swell
	Kim	0-15	0.6-2.0	9.0	7.9-8.4	2	.32	5T/Ac	B	60	Loamy	800#	10-14	Shrink-Swell Thin Layer
	Vona	3-60	2.0-6.0	6.0	6.6-7.8	2	.15	5T/Ac	B	60	Sandy	800#	10-14	Seepage
	Olney	3-60	0.6-2.0	7.8	6.6-7.8	2	.20	5T/Ac	B	60	Sandy	800#	10-14	Seepage Piping
	Worland	3-60	2.0-6.0	3.3	7.9-8.4	2-4	.20	3T/Ac	B	40	Sandy	375#	5-9	Piping Seepage
	Oceanet	3-60	2.0-6.0	1.4	7.9-9.0	2	.24	1T/Ac	D	20	Shallow Sandy	375#	5-9	Thin Layer Seepage
9	Nihilil	3-45	.6-2.0	6.0	7.4-7.8	-	.24	2T/Ac	B	60	Gravelly	300#	10-14	Seepage
	Shingle	3-45	.6-2.0	4.8	7.4-8.4	2	.24	2T/Ac	C	20	Shallow Loamy	900#	10-14	Thin Layer Low Strength
	Epsie	3-45	0.06	2.1	7.9-8.9	4	.32	3T/Ac	D	40	Saline Upland	300#	10-14	Weak Soil Thin Layer
10	Rock-outcrop Shingle	3-60	NOT APPLICABLE .6-2.0	4.8	7.4-8.4	2	.24	2T/Ac	C	20	Shallow Loamy	900#	10-14	Thin Layer Low Strength
	Tasael	3-60	2.0-6.0	2.25	7.4-8.4	2	.24	1T/Ac	D	20	Shallow Sandy	350#	10-14	Thin Layer Seepage
	Hoot	3-60	0.2-0.6	1.4	6.6-8.6	2	.15	1T/Ac	D	20	Shallow Loamy	900#	10-14	Thin Layer Seepage

TABLE E-1

SOIL MAP UNITS, SOIL SERIES INCLUDED AND THEIR PROPERTIES
(Continued)

Soil (Map) Unit	Associated Soil Series	Percent Slope	Surf. Perm. 1/ in/hr.	A.W.C. 2/ Profile	pH 3/ K 5/	E.C. 4/ T 6/	Erosion Soil Loss Hazard Tolerance	Hyd. Soil Grp 7/ In.	Soil Depth In.	Range Site 8/ Loamy	Prod. # lbs. Norm 9/	Precip. Zone	Construction Limitation 10/
11	Fort Collins	0-15	.6-2.0	9.5	6.6-7.8	2	.20	5T/Ac	B	60	1000#	10-14	Good
	Kim	0-15	.6-2.0	9.0	7.9-8.4	2	.32	5T/Ac	B	60	800#	10-14	Low Strength Shrink-Swell
	Worfka	0-15	0.2-0.6	4.0	6.6-8.4	2	.32	2T/Ac	D	20	900#	10-14	Thin Layer Weak Soil
	Cushman	0-15	0.6-2.0	7.2	6.6-8.4	-	.32	2T/Ac	C	40	800#	10-14	Shrink-Swell
	Gaynor	0-15	0.2-0.6	4.8	7.4-8.4	-	.24	2T/Ac	C	40	800#	10-14	Weak Soil
	Samsil	0-15	.06-0.2	1.7	7.4-8.4	-	.28	2T/Ac	C	20	300#	10-14	Thin Layer Weak Soil
12	Kim	0-10	.6-2.0	9.0	7.9-8.4	2	.32	5T/Ac	B	60	800#	10-14	Low Strength Shrink-Swell
	Kim Alkali	0-10	.6-2.0	9.6	7.9-9.0	4-8	.32	5T/Ac	B	60	900#	10-14	Piping Shrink-Swell
13	Nelson	3-60	2.0-6.0	5.2	7.9-9.0	2	.20	2T/Ac	B	40	800#	10-14	Piping
	Tassel	3-60	2.0-6.0	2.25	7.4-8.4	2	.24	1T/Ac	D	20	350#	10-14	Shrink-Swell
	Rock-outcrop		NOT APPLICABLE										Thin Layer
	Olney	3-60	0.6-2.0	7.8	6.6-7.8	2	.20	5T/Ac	B	60	800#	10-14	Seepage Piping
	Boubac	3-60	2.0-6.0	6.4	6.6-7.4	20	.28	3T/Ac	B	40	800#	10-14	Seepage
	Arvada	3-60	2.0-6.0	5.9	7.4-9.0	4	.32	5T/Ac	D	60	500#	10-14	Piping
	Shingle	3-45	0.6-2.0	4.8	7.4-8.4	2	.24	2T/Ac	C	20	900#	10-14	Shrink-Swell Thin Layer
	Thedalund	0-45	0.6-2.0	4.5	7.9-8.4	8	.32	2T/Ac	D	40	800#	10-14	Low Strength Seepage/Reclaim
	Kim	0-15	0.6-2.0	9.0	7.9-8.4	2	.32	5T/Ac	B	60	800#	10-14	Shrink-Swell Thin Layer
	Larimer	3-45	2.0-6.0	5.9	6.6-7.9	-	.24	3T/Ac	B	60	800#	10-14	Severe Seepage
	Larim	3-45	0.6-2.0	3.8	6.6-9.0	2	.24	2T/Ac	A	60	300#	10-14	Severe Seepage

TABLE E-1

SOIL MAP UNITS, SOIL SERIES INCLUDED AND THEIR PROPERTIES
(Continued)

Soil (Map) Unit	Associated Soil Series	Percent Slope	Surf. Perm. 1/ in/hr.	A.W.C. 2/ Profile	pH 3/	E.C. 4/ K 5/	Erosion Hazard T 6/	Soil Loss Tolerance Grp 7/	Hyd. Soil Depth In.	Soil Depth In.	Range Site 8/ Norm 9/	Prod. # lbs. Norm 9/	Precip. Zone	Construction Limitation 10/
14	Renohill	3-45	0.2-0.6	5.1	6.6-7.8	-	.37	3T/Ac	C	40	Clayey Shallow Loamy	800#	10-14	Weak Soil Thin Layer
	Worfka	3-45	0.2-0.6	4.0	6.6-8.4	2	.32	2T/Ac	D	20	Loamy	900#	10-14	Weak Soil Weak Soil Piping
	Cushman	3-45	0.6-2.0	7.2	6.6-8.4	-	.32	2T/Ac	C	40	Loamy	800#	10-14	Shrink-Swell
	Shingle	3-45	.6-2.0	4.8	7.4-8.4	2	.24	2T/Ac	C	20	Shallow Loamy	900#	10-14	Thin Layer Low Strength
	Rock-outcrop	NOT APPLICABLE												
15	Cadoma	3-45	.06-0.2	.43	7.9	4	.32	3T/Ac	D	40	Saline Upland Shallow	600#	10-14	Low Strength Reclaim
	Shingle	3-45	.6-2.0	4.8	7.4-8.4	2	.24	2T/Ac	C	20	Loamy	900#	10-14	Low Strength Reclaim
	Absted	3-45	2.0-6.0	10.1	7.9-8.4	2-8	.49	4T/Ac	D	60	Loamy	1500#	10-14	Shrink-Swell Reclaim
	Arvada	3-45	2.0-6.0	5.9	7.4-9.0	4	.32	5T/Ac	D	60	Saline Upland	500#	10-14	Piping Shrink-Swell
	Stoneham	3-45	.6-2.0	8.4	6.6-7.8	-	.20	5T/Ac	D	60	Loamy	800#	10-14	Shrink-Swell Piping
	Ulm	3-45	0.6-2.0	10.2	6.6-7.8	-	.20	5T/Ac	C	60	Loamy	800#	10-14	Piping Low Strength
	Petrie	3-45	.06-0.2	9.6	8	2-4	.49	5T/Ac	D	60	Saline Upland	600#	10-14	Shrink-Swell
	Kim Alkali	3-45	.6-2.0	9.6	7.9-9.0	4-8	.32	5T/Ac	B	60	Saline Lowland	900#	10-14	Piping Shrink-Swell
16	Fort Collins	3-30	.6-2.0	9.5	6.6-7.8	2	.20	5T/Ac	B	60	Loamy	1000#	10-14	Good
	Kim	3-30	.6-2.0	9.0	7.9-8.4	2	.32	5T/Ac	B	60	Loamy	800#	10-14	Low Strength Shrink-Swell
	Absted	3-30	2.0-6.0	10.1	7.9-8.4	2-8	.49	4T/Ac	D	60	Loamy	1500#	10-14	Shrink-Swell Reclaim

TABLE E-1
SOIL MAP UNITS, SOIL SERIES INCLUDED AND THEIR PROPERTIES
(Continued)

Soil (Map) Unit	Associated Soil Series	Percent Slope	Surf. Perm. 1/ in/hr.	A.W.C. 2/ Profile	pH 3/	E.C. 4/ K 5/	Erosion Soil Loss Tolerance T 6/	Hyd. Grp 7/	Soil Depth In.	Range Site 8/ Loamy	Prod. # lbs. Norm 9/	Precip. Zone	Construction Limitation 10/	
	Cushman	3-30	0.6-2.0	7.2	6.6-8.4	-	.32	2T/Ac	C	40	Loamy	800#	10-14	Shrink-Swell Piping
	Thedlund	3-30	0.6-2.0	4.5	7.9-8.4	8	.32	2T/Ac	D	40	Loamy	800#	10-14	Seepage-Reclaim
	Terry	3-30	2.0-6.0	4.1	7.4-7.8	-	.20	2T/Ac	B	40	Sandy	800#	10-14	Seepage
	Worf	3-30	0.6-2.0	2.0	6.6-8.4	2	.28	2T/Ac	D	20	Shallow Loamy	900#	10-14	Thin Layer Seepage
	Reno Hill	3-30	0.2-0.6	6.0	6.6-7.8	-	.37	3T/Ac	C	40	Clayey	800#	10-14	Weak Soil
17	Ni Hill	3-45	.6-2.0	6.0	7.4-7.8	-	.24	2T/Ac	B	60	Gravelly Shallow	300#	10-14	Seepage Low Strength
	Shingle	3-45	.6-2.0	4.8	7.4-8.4	2	.24	2T/Ac	C	20	Loamy	900#	10-14	Reclaim
	Larimer	3-45	2.0-6.0	5.9	6.6-7.9	-	.24	3T/Ac	B	60	Loamy	800#	10-14	Severe Seepage
	Stoneham	3-45	.6-2.0	8.4	6.6-7.8	-	.20	5T/Ac	D	60	Loamy	800#	10-14	Shrink-Swell Piping
	Vona	3-45	2.0-6.0	6.0	6.6-7.8	2	.15	5T/Ac	B	60	Sandy	800#	10-14	Seepage-Piping
	Otero	3-45	6.0-20.0	6.1	7.0-8.4	2	.10	5T/Ac	B	60	Sandy	800#	10-14	Seepage
	Nelson	3-45	2.0-6.0	5.2	7.9-9.0	2	.20	2T/Ac	B	40	Sandy	800#	10-14	Seepage
	Terry	3-45	2.0-6.0	3.9	7.0-7.8	2	.20	2T/Ac	B	40	Sandy	800#	10-14	Seepage
18	Larim	3-60	2.0-6.0	6.1	6.6-7.9	-	.24	3T/Ac	B	60	Gravelly	350#	10-14	Severe Seepage
	Larimer	3-60	2.0-6.0	5.9	6.6-7.9	-	.24	3T/Ac	B	60	Loamy	800#	10-14	Severe Seepage
	Oceanet	3-60	2.0-6.0	1.4	7.9-9.0	2	.24	1T/Ac	D	20	Shallow Sandy	375#	5-9	Thin Layer Seepage
	Persayo	3-60	0.2-0.6	2.2	7.9-9.0	8	.37	1T/Ac	D	20	Saline Upland	350#	5-9	Thin Layer Piping
	Rock Outcrop		NOT APPLICABLE											
19	Blazon	3-60	0.2-0.6	2.8	7.9-9.0	2-4	.43	1T/Ac	D	20	Loamy	750#	10-14	Thin Layer
	Rock-outcrop		NOT APPLICABLE											
	Brownsto	3-60	2.0-6.0	3.7	7.9-8.4	-	.17	5T/Ac	B	20	Shallow	1200#	10-14	Seepage
	Diamondville	3-60	0.6-2.0	4.4	6.6-7.8	2	.37	3T/Ac	C	40	Loamy	800		Low Strength
	Nielsem	3-60	0.2-0.6	2.6	6.6-7.3	-	.24	1T/Ac	D	20	Shallow Loamy	1300#	15-19	Piping
	Nielsen													Thin Layer
	Nielsen Variant	3-60	0.2-0.6	2.6	6.6-7.8	2	.24	1T/Ac	D	20	Shallow Loamy	700#	15-19	Piping Thin Layer

TABLE E-1
SOIL MAP UNITS, SOIL SERIES INCLUDED AND THEIR PROPERTIES
(Continued)

Soil (Map) Unit	Associated Soil Series	Percent Slope	Surf. Perm. 1/ in/hr.	A.W.C. 2/ Profile	pH 3/ in/hr.	E.C. 4/ Profile	Erosion Hazard K 5/ T 6/ Tolerance	Soil Loss Tolerance T 6/ Tolerance	Hyd. Soil Grp 7/ Grp	Soil Depth In.	Range Site 8/ Loomy	Prod. # lbs. Norm 9/ Norm	Precip. Zone	Construction Limitation 10/ Limitation
	Remohill Worika	3-30 3-45	0.2-0.6 0.2-0.6	6.0 4.0	6.6-7.8 6.6-8.4	- 2	.37 .32	37/Ac 27/Ac	C D	40 20	Clayey Loamy	800# 900#	10-14 10-14	Weak Soil Weak Soil Piping
20	Bridger Abes	3-30 3-30	0.6-2.0 0.2-0.6	7.2 2.5	6.6-7.3 6.1-7.4	2 2	.28 .24	57/Ac 17/Ac	B D	60 20	Clayey Shallow Clayey	1300# 500#	15-19 15-19	Weak Soil Thin Layer Piping
	Burnette	3-30	0.6-2.0	6.4	6.6-7.3	2	.28	57/Ac	C	60	Loamy	1100#	15-19	Low Strength Piping
	Clayburn	3-30	0.6-2.0	9.0	6.1-7.4	-	.20	47/Ac	B	60	Loamy	1350#	15-19	Seepage-Piping
21	Patent	3-15	0.6-2.0	12.0	7.4-9.4	2	.32	57/Ac	B	60	Loamy	900#	10-14	Seepage Low Strength
	Forelle	3-15	0.6-2.0	9.6	6.6-7.8	2	.28	57/Ac	B	60	Loamy	900#	10-14	Fair
	Pinelli	3-15	0.6-2.0	7.2	6.6-7.8	2-4	.32	57/Ac	B	60	Loamy	1100#	10-14	Low Strength Piping
	Alcova	3-15	0.6-2.0	7.2	6.6-7.8	2	.32	57/Ac	B	60	Sandy	800#	10-14	Seepage
22	Wix	3-60	2.0-6.0	4.0	6.1-7.3	-	.15	27/Ac	C	40	Loamy	1100#	15-19	Piping Thin Layer
	Judkins	3-60	0.6-2.0	1.8	5.1-7.6	-	.28	27/Ac	C	40	Woodland	2000#	15-19	Rocks-Seepage
	Nielson	3-60	0.2-0.6	2.6	6.6-7.3	-	.24	17/Ac	D	20	Shallow Loamy	1300#	15-19	Piping Thin Layer
	Abes	3-60	0.2-0.6	2.5	6.1-7.4	2	.24	17/Ac	D	20	Shallow Clayey	500#	15-19	Thin Layer Piping
	Rock-outcrop Gillespie	NOT APPLICABLE		3.2	6.1-7.3	2	.37	17/Ac	D	20	Woodland	1100#	15-19	Severe Seepage
	Bachus	3-60	0.6-2.0	5.0	5.6-6.5	2	.32	27/Ac	C	40	Loamy	2500#	15-19	Low Strength Piping
	Wetterhorn	3-60	0.6-2.0	8.2	6.5-7.2	-	.24	27/Ac	B	40	Woodland	2500#	15-19	Good
	Wetterhorn Var	3-60	0.6-2.0	6.5	6.5-7.2	-	.24	27/Ac	B	40	Woodland	2500#	15-19	Seepage
	Mayoworth	3-45	0.6-2.0	6.0	6.1-7.8	2	.37	27/Ac	C	40	Loamy	1400#	15-19	
	Burnette	3-30	0.6-2.0	6.4	6.6-7.3	2	.28	57/Ac	C	60	Loamy	1100#	15-19	Low Strength Piping

TABLE E-1

SOIL MAP UNITS, SOIL SERIES INCLUDED AND THEIR PROPERTIES
(Continued)

Soil (Map) Unit	Associated Soil Series	Percent Slope	Surf. Perm. 1/ in/hr.	A.W.C. 2/ Profile	pH 3/	E.C. 4/ K 5/	Erosion Hazard	Soil Loss Tolerance	Hyd. Soil Grp 7/	Soil Depth In.	Range Site 8/ Shallow Loamy	Prod. # lbs. Norm 9/ 700#	Precip. Zone	Construction Limitation 10/ Piping Thin Layer
	Nielsen Var.	3-60	0.2-0.6	2.6	6.6-7.8	2	.24	1T/Ac	D	20	Shallow Loamy	1300#	15-19	Piping Thin Layer
23	Nielsen	3-60	0.2-0.6	2.6	6.6-7.3	-	.24	1T/Ac	D	20	Shallow Loamy	1300#	15-19	Piping Thin Layer
	Gillespie	3-60	0.6-2.0	3.2	6.1-7.3	2	.37	1T/Ac	D	20	Woodland	1100#	15-19	Severe Seepage
	Rock-outcrop		NOT APPLICABLE											
	Merino	3-60	0.6-2.0	3.0	7.0-7.9	2	.28	1T/Ac	D	40	Shallow Loamy	850#	15-19	Thin Layer Low Strength
	Bachus	3-60	0.6-2.0	5.0	5.6-6.5	2	.32	2T/Ac	C	40	Loamy	2500#	15-19	Low Strength Piping
	Wix	3-60	2.0-6.0	4.0	6.1-7.3	-	.15	2T/Ac	C	40	Loamy	1100#	15-19	Piping Thin Layer
24	Burnette	3-60	0.6-2.0	6.4	6.6-7.3	2	.28	5T/Ac	C	60	Loamy	1100#	15-19	Low Strength Piping
	Abes	3-60	0.2-0.6	2.5	6.1-7.4	2	.24	1T/Ac	D	20	Shallow Clayey	500#	15-19	Thin Layer Piping
	Rock-outcrop		NOT APPLICABLE											
	Cryoborolls		TOO VARIED FOR INTERPRETATION											
	Cryorthents		TOO VARIED FOR INTERPRETATION											
25	Renohill	3-60	0.2-0.6	6.0	6.6-7.8	-	.37	3T/Ac	C	40	Clayey	800#	10-14	Weak Soil
	Cadoma	3-60	.06-0.2	4.3	7.9	4	.32	3T/Ac	D	40	Saline Upland	600#	10-14	Low Strength Reclaim
	Worfka	3-60	0.2-0.6	5.1	6.6-7.8	-	.37	3T/Ac	C	40	Clayey	800#	10-14	Weak Soil
	Shingle	3-60	0.6-2.0	4.8	7.4-8.4	2	.24	2T/Ac	C	20	Shallow Loamy	900#	10-14	Thin Layer Low Strength
	Rock-outcrop		NOT APPLICABLE											
	Bondman	3-60	2.0-6.0	4.2	6.6-7.8	2	.20	1T/Ac	C	20	Shallow Loamy	900#	10-14	Thin Layer Seepage
	Worf	3-60	0.6-2.0	2.0	6.6-8.4	2	.28	2T/Ac	D	20	Shallow Loamy	900#	10-14	Thin Layer Seepage

TABLE E-1
SOIL MAP UNITS, SOIL SERIES INCLUDED AND THEIR PROPERTIES
(Continued)

Soil (Map Unit)	Associated Soil Series	Percent Slope	Surf. Perm. 1/ in/hr.	A.W.C. 2/ Profile	pH 3/	E.C. 4/ 2-4	Erosion Hazard K 5/	Soil Loss Tolerance T 6/	Hyd. Soil D 7/	Soil Depth In.	Range Site 8/ Upland	Prod. # lbs. Norm 9/	Precip. Zone	Construction Limitation 10/
26	Petrie	3-60	.06-0.2	9.6	8		.49	5T/Ac	D	60	Saline Upland	600#	10-14	Low Strength Shrink-Swell
	Cadoma	3-60	.06-0.2	4.3	7.9	4	.32	3T/Ac	D	40	Saline Upland	600#	10-14	Low Strength Shrink-Swell
	Epsie	3-60	0.06	2.1	7.9-8.9	4	.32	3T/Ac	D	20	Saline Upland	300#	10-14	Weak Soil Thin Layer
	Kim	3-60	.6-2.0	9.0	7.9-8.4	2	.32	5T/Ac	B	60	Loamy	800#	10-14	Low Strength Shrink-Swell
	Arvada	3-60	2.0-6.0	5.9	7.4-9.0	4	.32	5T/Ac	D	60	Saline Upland	500#	10-14	Piping Shrink-Swell
	Worfka	3-60	0.2-0.6	5.1	6.6-7.8	-	.37	3T/Ac	C	40	Clayey	800#	10-14	Weak Soil
	Shingle	3-60	.6-2.0	4.8	7.4-8.4	2	.24	2T/Ac	C	20	Shallow Loamy	900#	10-14	Thin Layer Low Strength
	Rock-outcrop		NOT APPLICABLE											
27	Youngston		0.2-0.6	10.2	8.4	8-16	.37	5T/Ac	D	60	Loamy	1500#	5-9	Low Strength
	Uffens		0.2-0.6	8.8	8.4	16	.49	1T/Ac	D	60	Saline Upland	500#	5-9	Low Strength Piping
	Lostwells		0.6-2.0	9.3	9.0	8-16	.32	5T/Ac	D	60	Loamy	1500#	5-9	Low Strength
	Bondman		2.0-6.0	4.2	6.6-7.8	2	.20	1T/Ac	D	20	Shallow Loamy	900#	10-14	Thin Layer Seepage
	Worfka		0.2-0.6	5.1	6.6-7.8	-	.37	3T/Ac	C	40	Clayey	800#	10-14	Weak Soil
	Worf		0.6-2.0	2.0	6.6-8.4	2	.28	2T/Ac	D	20	Shallow Loamy	900#	10-14	Thin Layer Seepage
	Pavillion		0.6-2.0	5.6	7.4-9.0	2-4	.24	3T/Ac	B	40	Loamy	800#	10-14	Low Strength
	Persayo		0.2-0.6	2.2	7.9-9.0	8	.37	1T/Ac	D	20	Saline Upland	350#	5-9	Thin Layer Piping
	Oceanet		2.0-6.0	1.4	7.9-9.0	2	.24	1T/Ac	D	20	Shallow Sandy	375#	5-9	Thin Layer Seepage
	Rock-outcrop		NOT APPLICABLE											
	Shingle		.6-2.0	4.8	7.4-8.4	2	.24	2T/Ac	C	20	Shallow Loamy	900#	10-14	Thin Layer Low Strength
	Tassel		2.0-6.0	2.25	7.4-8.4	2	.24	1T/Ac	D	20	Shallow Sandy	350#	10-14	Thin Layer Seepage

TABLE E-1

SOIL MAP UNITS, SOIL SERIES INCLUDED AND THEIR PROPERTIES
(Continued)

Soil (Map) Unit	Associated Soil Series	Percent Slope	Surf. Perm. 1/ in/hr.	A.W.C. 2/ Profile	pH 3/	E.C. 4/ K 5/	Erosion Soil Loss Hazard Tolerance K 5/	Hyd. Soil Grp 7/	Soil Depth In.	Range Site 8/	Prod. # lbs. Norm 9/	Precip. Zone	Construction Limitation 10/
28	Nelsen	3-60	2.0-6.0	5.2	7.9-9.0	2	.20	2T/Ac	B	40	800#	10-14	Seepage
	Terry	3-30	2.0-6.0	4.1	7.4-7.8	-	.20	2T/Ac	B	40	800#	10-14	Seepage
	Otero	3-45	6.0-20.0	6.1	7.0-8.4	2	.10	5T/Ac	B	60	800#	10-14	Seepage
	Rock-outcrop		NOT APPLICABLE										
	Persayo	0-60	0.2-0.6	2.2	7.9-9.0	8	.37	1T/Ac	D	20	Saline Upland	350#	5-9 Thin Layer Piping
	Worland	0-60	2.0-6.0	3.3	7.9-8.4	2-4	.20	3T/Ac	B	40	Sandy	375#	5-9 Piping-Seepage
	Oceanet	0-60	2.0-6.0	1.4	7.9-9.0	2	.24	1T/Ac	D	20	Shallow Sandy	375#	5-9 Thin Layer Seepage
	Saddle	0-60	0.6-2.0	3.0	7.4-8.4	4	.32	3T/Ac	C	40	Sandy	375#	5-9 Seepage
	Ranchhill	0-60	0.2-0.6	5.1	6.6-7.4	-	.37	3T/Ac	C	40	Clayey	800#	10-14 Weak Soil
	Cushman	0-60	0.6-2.0	7.2	6.6-8.4	-	.32	2T/Ac	C	40	Loamy	800#	10-14 Piping Shrink-Swell
	Worfka	0-60	0.2-0.6	1.1	6.6-7.8	-	.37	3T/Ac	C	40	Clayey	800#	10-14 Weak Soil
29	Stoneham	0-45	0.6-2.0	8.4	6.6-7.8	-	.20	5T/Ac	D	60	Loamy	800#	10-14 Shrink-Swell
	Cushman	0-45	0.6-2.0	7.2	6.6-8.4	-	.32	2T/Ac	C	40	Loamy	800#	10-14 Piping Shrink-Swell
	Orella	0-45	.06-0.2	1.8	7.9-9.0	-	.49	1T/Ac	D	20	Saline Upland	300#	10-14 Weak Soil
	Epsie	0-45	0.06	2.1	7.9-8.9	4	.32	3T/Ac	D	40	Saline Upland	300#	10-14 Weak Soil Thin Layer
	Rock-outcrop		NOT APPLICABLE										
	Absted	0-45	2.0-6.0	10.1	7.9-8.4	2-8	.49	4T/Ac	O	60	Loamy	1500#	10-14 Shrink-Swell Reclaim
	Arvada	0-45	2.0-6.0	5.9	7.4-9.0	4	.32	5T/Ac	D	60	Saline Upland	500#	10-14 Piping Shrink-Swell
	Kim	0-45	.6-2.0	9.0	7.9-8.4	2	.32	5T/Ac	B	60	Loamy	800#	10-14 Low Strength Shrink-Swell
	Shingle	0-45	.6-2.0	4.8	7.4-8.4	2	.24	2T/Ac	C	20	Shallow Loamy	900#	10-14 Thin Layer Low Strength
	Thedlund	0-45	.6-2.0	4.5	7.9-8.4	8	.32	2T/Ac	D	40	Loamy	800#	10-14 Seepage-Reclaim
30	Hoot	3-60	0.2-0.6	1.4	6.6-8.6	2	.15	1T/Ac	D	20	Shallow Loamy	900#	10-14 Thin Layer Seepage
	Rock-outcrop		NOT APPLICABLE										

TABLE E-1

SOIL MAP UNITS, SOIL SERIES INCLUDED AND THEIR PROPERTIES
(Continued)

Soil (Map) Unit	Associated Soil Series	Percent Slope	Surf. Perm. 1/ in/hr.	A.W.C. 2/ Profile	pH 3/	E.C. 4/ K 5/	Erosion Hazard Tolerance K 5/	Soil Loss T 6/	Hyd. Soil Grp 7/	Soil Depth In.	Range Site 8/ Norm 9/	Prod. # lbs. Zone	Precip. Zone	Construction Limitation 10/
	Greybull	3-60	0.2-0.6	4.3	7.9-9.0	2-4	.37	3T/Ac	C	40	Saline Upland	350#	5-9	Thin Layer Shrink-Swell
	Persayo	3-60	0.2-0.6	2.2	7.9-9.0	8	.37	1T/Ac	D	20	Saline Upland	375#	5-9	Thin Layer Piping
	Worland	3-60	2.0-6.0	3.3	7.9-8.4	2-4	.20	3T/Ac	B	40	Sandy	375#	5-9	Piping-Seepage
31	Garland	0-30	0.6-2.0	6.5	6.6-8.4	2-4	.28	1T/Ac	B	60	Gravelly	350#	5-9	Seepage
	Griffy	0-30	2.0-6.0	7.2	7.4-7.8	4	.32	5T/Ac	B	60	Sandy	375#	5-9	Seepage
	Wallson	0-30	6.0	5.5	6.6-7.3	2	.32	2T/Ac	B	60	Sandy	375	5-9	Seepage
32	Youngston	0-30	0.2-0.6	10.2	8.4	8-16	.37	5T/Ac	D	60	Loamy	1500#	5-9	Low Strength
	Uffens	0-30	0.2-0.6	8.8	8.4	16	.49	1T/Ac	D	60	Saline Upland	500#	5-9	Low Strength Piping
	Lostwells	0-30	0.6-2.0	9.3	9.0	8-16	.32	5T/Ac	D	60	Loamy	1500#	5-9	Low Strength
	Persayo	0-30	0.2-0.6	2.2	7.9-9.0	8	.37	1T/Ac	D	20	Saline Upland	750	5-9	Thin Layer Piping
	Rock-outcrop Huff	0-30	NOT APPLICABLE 0.6-2.0	4.5	7.4-8.4	2-4	.20	3T/Ac	D	40	Saline Upland	350#	5-9	Thin Layer Piping
	Neiber	0-30	2.0-6.0	3.0	6.6-7.8	2-4	.20	3T/Ac	B	40	Loamy	365#	5-9	Thin Layer
	Wallson	0-30	6.0	5.5	6.6-7.3	2	.32	2T/Ac	B	60	Sandy	375	5-9	Seepage
	Worland	3-60	2.0-6.0	3.3	7.9-8.4	2-4	.20	3T/Ac	B	40	Sandy	375#	5-9	Piping-Seepage
	Oceanet	3-30	2.0-6.0	1.4	7.9-9.0	2	.24	1T/Ac	D	20	Shallow Sandy	375#	5-9	Thin Layer Seepage
33	Wallson	0-45	6.0	5.5	6.6-7.3	2	.32	2T/Ac	B	60	Sandy	375#	5-9	Seepage
	Uffens	0-45	0.2-0.6	8.8	8.4	16	.49	1T/Ac	D	60	Saline Upland	500#	5-9	Low Strength Piping
	Rairdent	0-45	0.6-2.0	6.3	7.9-8.4	8-16	.24	5T/Ac	D	60	Loamy	375#	5-9	Low Strength
	Greybull	0-45	0.2-0.6	4.3	7.9-9.0	2-4	.37	3T/Ac	C	40	Saline Upland	350#	5-9	Thin Layer Shrink-Swell
	Persayo	0-45	0.2-0.6	2.2	7.9-9.0	8	.37	1T/Ac	D	20	Saline Upland	350#	5-9	Thin Layer Piping
	Cliffersom	0-45	2.0-6.0	2.9	7.9-8.4	2	.28	5T/Ac	B	40	Gravelly	370#	5-9	Severe Seepage
	Lostwells	0-45	0.6-2.0	9.3	9.0	8-16	.32	5T/Ac	D	60	Loamy	1500#	5-9	Low Strength

TABLE E-1

SOIL MAP UNITS, SOIL SERIES INCLUDED AND THEIR PROPERTIES
(Continued)

Soil (Map) Unit	Associated Soil Series	Percent Slope	Surf. Perm. 1/ in/hr.	A.W.C. 2/ Profile	pH 3/	E.C. 4/	Erosion Hazard K 5/	Soil Loss Tolerance T 6/	Hyd. Soil Grp 7/	Soil Depth In.	Range Site 8/ Norm 9/	Prod. # lbs. Norm 9/	Precip. Zone	Construction Limitation 10/
	Blinton	0-6	0.06-0.2	7.2	8.5-9.9	2.8	.32	5T/Ac	C	60	Saline	375#	5-9	Weak Soil
	Uffens	0-6	0.2-0.6	8.5	8.4-9.9	16	.49	1T/Ac	D	60	Upland	375#	5-9	Excess Alkali
34	Renohill	3-30	0.2-0.6	6.0	6.6-7.8	-	.37	3T/Ac	C	40	Upland	800#	10-14	Weak Soil
	Cushman	0-15	0.6-2.0	7.2	6.6-8.4	-	.32	2T/Ac	C	40	Loamy	800#	10-14	Excess Alkali
	Worika	3-45	0.2-0.6	4.0	6.6-8.4	2	.32	2T/Ac	D	20	Loamy	900#	10-14	Weak Soil
	Persayo	3-60	0.2-0.6	2.2	7.9-9.0	8	.37	1T/Ac	D	20	Saline	350#	5-9	Shrink-Swell
	Clifterson	3-60	2.0-6.0	2.9	7.9-8.4	2	.28	5T/Ac	B	40	Upland	375#	5-9	Weak Soil
	Nihill	3-45	0.6-2.0	6.0	7.4-7.8	-	.24	2T/Ac	B	60	Gravelly	370#	5-9	Piping
	Shingle	3-45	0.6-2.0	4.8	7.4-8.4	2	.24	2T/Ac	C	20	Shallow	900#	10-14	Seepage
	Worland	3-60	2.0-6.0	3.3	7.9-8.4	2-4	.20	3T/Ac	B	40	Loamy	375#	5-9	Thin Layer
	Oceanet	3-60	2.0-6.0	1.4	7.9-9.0	2	.24	1T/Ac	D	20	Sandy	375#	5-9	Low Strength
	Haidt	3-60	0.06-0.2	6.0	7.9-9.0	8	.28	5T/Ac	C	60	Shallow	800#	10-14	Piping-Seepage
	Worf	3-60	0.6-2.0	2.0	6.6-8.4	2	.28	2T/Ac	D	20	Sandy	375#	5-9	Thin Layer
	Rock-outcrop		NOT APPLICABLE								Loamy	900#	10-14	Seepage
35	Persayo	0-45	0.2-0.6	2.2	7.9-9.0	8	.37	1T/Ac	D	20	Saline	350#	5-9	Thin Layer
	Muff	0-45	0.6-2.0	4.5	7.4-8.4	2-4	.20	3T/Ac	D	40	Upland	350#	5-9	Piping
	Rock-outcrop		NOT APPLICABLE								Saline	350#	5-9	Thin Layer
	Uffens	0-45	0.2-0.6	8.8	8.4	16	.49	1T/Ac	D	60	Upland	500#	5-9	Piping
	Rairdent	0-45	0.6-2.0	6.3	7.9-8.4	8-16	.24	5T/Ac	D	60	Loamy	375#	5-9	Low Strength
36	Worland	3-60	2.0-6.0	3.3	7.9-8.4	2-4	.20	3T/Ac	B	40	Sandy	375#	5-9	Piping
	Persayo	3-60	0.2-0.6	2.2	7.9-9.0	8	.37	1T/Ac	D	20	Saline	350#	5-9	Thin Layer
	Uffens	3-60	0.2-0.6	8.8	8.4	16	.49	1T/Ac	D	60	Upland	500#	5-9	Piping

TABLE E-1

SOIL MAP UNITS, SOIL SERIES INCLUDED AND THEIR PROPERTIES
(Continued)

Soil Unit	Associated Soil Series	Percent Slope	Surf. Perm. 1/ in/hr.	A.W.C. 2/ Profile	pH 3/	E.C. 4/	Erosion Hazard K 5/	Soil Loss Tolerance T 6/	Hyd. Soil Grp 7/	Soil Depth In.	Range Site 8/ Sandy	Prod. # lbs. Normal 9/	Precip. Zone	Construction Limitation 10/
	Oceanet	3-60	2.0-6.0	1.4	7.9-9.0	2	.24	1T/Ac	D	20	Shallow	375#	5-9	Thin Layer Seepage
	Rock-outcrop Clifferson	3-60	NOT APPLICABLE 2.0-6.0	2.9	7.9-8.4	2	.28	5T/Ac	B	40	Gravelly	370#	5-9	Severe Seepage
37	Uffens	0-45	0.2-0.6	8.8	8.4	16	.49	1T/Ac	D	60	Saline	500#	5-9	Low Strength
	Persayo	0-45	0.2-0.6	2.2	7.9-9.0	8	.37	1T/Ac	D	20	Upland Saline	350#	5-9	Piping Thin Layer Piping
	Rock-outcrop		NOT APPLICABLE											

- 1/ Surface Permeability - The measure of a soil's ability to pass water through its pore spaces, measured in inches per hour. Larger pores, such as those found in sandy textured soils, pass water faster than fine textured soils with very small pores. Values range from 0.06 to 20.0.
- 2/ A.W.C. - Available water capacity or moisture holding capacity of the soil. In this report, it refers to the water available for plant uptake in the soil profile.
- 3/ pH - Negative log of the hydrogen ion activity. Below pH7, hydrogen ion activity makes the soil acid; above pH7, hydroxyl ion activity makes the soil alkaline.
- 4/ E.C. - Measurement of the electrical conductivity of dissolved salts (salinity) in the soil. High conductivity shows high salt concentrations. 640 times the electrical conductivity gives parts per million salt.
- 5/ Erosion Hazard "K" - Measurement of the inherent erodibility hazard of the soil. The higher the "K" value, the higher the erosion hazard. Values range from .10 to .55.
- 6/ Soil Loss Tolerance "T" - Allowable loss in tons per acre of soil from the surface horizon. Within the accepted limits, the soil will renew itself. If limits are exceeded, the soil resource will be depleted. Values range from 1 to 5.
- 7/ Hydrologic Group - Measure of the runoff hazard from the soil. Four groups exist, A through D. A has the lowest runoff hazard and D has the highest runoff hazard.
- 8/ Range Sites - The designation of the soil-vegetation relationship for a given soil. Soil depth, surface texture, and plant types are determining factors.
- 9/ Prod. # lbs. Normal - Under usual climatic conditions, the quantity by weight of annual forage growth the soil will produce.
- 10/ Construction Limits - Characteristics of the soil that impose limitations on construction projects, such as buildings or water containment structures.

APPENDIX E

TABLE E-2

SOIL MAP UNITS, UNIT GROUP NUMBERS, AND ACREAGES

Map Unit	Unit Group No.	BLM Area (Acres)	Other Area (Acres)
2	II	35,699	12,205
3	II	2,306	769
4	II	2,565	14,533
5	II	7,653	10,312
6	II	31,758	6,088
7	II	8,730	1,354
8	II	27,105	7,620
9	II	33,711	4,420
10	II	5,375	283
11	II	4,630	3,087
12	II	2,257	2,613
13	II	40,179	16,991
14	II	3,169	792
15	II	4,444	4,788
16	II	4,017	2,191
17	II	23,216	1,222
18	II	287	5,449
19	III	76,905	89,775
20	IV	4,000	5,000
21	III	5,614	4,093
22	IV	25,640	25,640
23	IV	19,892	27,267
24	IV	5,579	6,708
25	II	18,183	3,068
26	II	9,821	5,064
27	I	27,561	27,561
28	I	40,465	4,496
29	II	8,609	8,609
30	I	62,369	2,995
31	I	11,000	579
32	I	94,866	4,028
33	I	60,441	4,399
34	I	75,328	8,370
35	I	4,768	0
36	I	160,233	6,698
37	I	7,753	0
F1	I	2,567	18,262
M1	III	43,304	171,671
TOTAL		1,002,000	519,000

These acreages include agricultural lands.

APPENDIX E

TABLE E-3

SEDIMENT YIELDS AND VEGETATIVE COVER CHANGES
FOR "I" CATEGORY ALLOTMENTS

Allotments	Existing Environment		Percent Vegetative Cover Change	Proposed Action	
	Rate (AcFt/mi ² /yr)	Total AcFt/yr		Rate (AcFt/mi ² /yr)	Total AcFt/yr
507	1.08	110	4	.53	53.8
508	1.20	258	5	.56	111.3
509	.65	91	1	.53	74.3
510	.91	15	0	.68	11.4
516	.73	4.7	3	.45	2.9
522	1.4	22.6	0	.73	11.8
524	.73	2.9	2	.35	1.4
525	.79	4.4	3	.56	3.1
526	.60	4.1	5	.34	2.3
529	.91	16.3	0	.56	10.0
531	1.30	4.0	0	.55	1.7
537	.68	5.1	0	.30	2.3
538	.85	3.5	0	.68	2.8
541	.45	1.1	1	.35	.9
542	1.00	5.1	9	.70	3.6
545	1.35	12.6	1	.55	5.1
556	.80	2.9	0	.29	1.0
558	.65	1.2	4	.37	.7
560	.56	1.5	0	.53	1.5
568	.58	15.7	3	.30	8.1
573	.85	7.9	0	.52	4.8
575	.85	4.7	0	.73	4.0
579	1.00	23.7	4	.70	16.6
590	1.23	17.7	1	.87	12.5
596	.95	15.7	0	.55	9.1
605	.98	76.8	0	.50	39.2
606	.98	66.2	2	.48	32.5
607	.73	7.1	2	.40	3.9
609	.79	5.0	9	.65	4.1
614	.65	1.6	3	.42	1.0
615	.65	2.5	0	.56	2.2
620	.85	10.3	0	.42	5.1
621	1.08	5.2	1	.52	2.5
622	.95	13.5	0	.52	7.4
626	.63	8.5	1	.53	7.1
627	.95	9.2	0	.44	4.2
628	.91	6.5	1	.48	3.4
633	.70	12.0	0	.31	5.3
634	.70	17.4	0	.44	10.9
635	.56	1.4	1	.68	1.1
637	1.20	11.6	1	.42	6.6
639	.79	26.3	2	.65	14.0
640	.87	20.7	2	.51	13.5
642	.85	15.0	4	.55	9.0
652	.91	35.6	0	.70	21.5

APPENDIX E

TABLE E-3

SEDIMENT YIELDS AND VEGETATIVE COVER CHANGES
FOR "I" CATEGORY ALLOTMENTS
(Cont'd)

Allotments	Existing Environment		Percent Vegetative Cover Change	Proposed Action	
	<u>Rate</u> (AcFt/mi ² /yr)	<u>Total</u> AcFt/yr		<u>Rate</u> (AcFt/mi ² /yr)	<u>Total</u> AcFt/yr
652	.91	35.6	0	.70	21.5
662	.82	34.1	0	.60	29.2
669	.79	19.0	2	.65	14.4
671	.95	36.3	5	.28	24.8
678	.68	13.9	1	.30	5.7
681	.79	5.0	8	.30	1.9
1070	.98	27.4	2	.85	23.7
1071	.87	7.5	5	.45	3.9
2510	.95	5.7	7	.36	2.2

APPENDIX E

TABLE E4
U.S. DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

SEDIMENT YIELD FACTOR RATING

SURFACE GEOLOGY (a)		SOILS (b)		CLIMATE (c)		RUNOFF (d)		TOPOGRAPHY (e)	
(10)		(10)		(10)		(10)		(20)	
a. Marine shales and related mudstones and siltstones		a. Fine textured; easily dispersed; saline-alkaline; high shrink-swell characteristics b. Single grain silts and fine sands		a. Storms of several days' duration with short periods of intense rainfall b. Frequent intense convective storms c. Freeze-thaw occurrence		a. High peak flows per unit area b. Large volume of flow per unit area		a. Steep upland slopes (in excess of 30%) b. High relief; little or no floodplain development	
(5)		(5)		(5)		(5)		(10)	
a. Rocks of medium hardness b. Moderately weathered c. Moderately fractured		a. Medium textured soil b. Occasional rock fragments c. Caliche layers		a. Storms of moderate duration and intensity b. Infrequent convective storms		a. Moderate peak flows per unit area b. Moderate volume of flow per unit area		a. Moderate upland slopes (less than 20%) b. Moderate fan or floodplain development	
(0)		(0)		(0)		(0)		(0)	
a. Massive, hard formations		a. High percentage of rock fragments b. Aggregated clays c. High in organic matter		a. Humid climate with rainfall of low intensity b. Precipitation in form of snow c. Arid climate, low intensity storms d. Arid climate; rare convective storms		a. Low peak flows per unit area b. Low volume of runoff per unit area c. Rare runoff events		a. Gentle upland slopes (less than 5%) b. Extensive alluvial plains	
Factor value									
GROUND COVER (f)		LAND USE (g)		UPLAND EROSION (h)		CHANNEL EROSION AND SEDIMENT TRANSPORT (i)			
(10)		(10)		(25)		(25)			
Ground cover does not exceed 20% a. Vegetation sparse; little or no litter b. No rock in surface soil		a. More than 50% cultivated b. Almost all of area intensively grazed c. All of area recently burned		a. More than 50% of the area characterized by rill and gully or landslide erosion		a. Eroding banks continuously or at frequent intervals with large depths and long flow duration b. Active headcuts and degradation in tributary channels			
(0)		(0)		(10)		(10)			
Cover not exceeding 40% a. Noticeable litter b. If trees present understory not well developed		a. Less than 25% cultivated b. 50% or less recently logged c. Less than 50% intensively grazed d. Ordinary road and other construction		a. About 25% of the area characterized by rill and gully or landslide erosion b. Wind erosion with deposition in stream channels		a. Moderate flow depths, medium flow duration with occasionally eroding banks or bed			
(-10)		(-10)		(0)		(0)			
a. Area completely protected by vegetation, rock fragments, litter b. Little opportunity for rainfall to reach erodible material		a. No cultivation b. No recent logging c. Low intensity grazing		a. No apparent signs of erosion		a. Wide shallow channels with flat gradients and short flow duration b. Channels in massive rock, large boulders, or well vegetated c. Artificially controlled channels			
Factor value									
Subtotal (a) - (g)				Subtotal (h) - (i)		TOTAL RATING - - - = - - - ac.ft./sq. mi./yr.			

(Instructions on reverse)

RELATIONSHIP BETWEEN PSIAc SEDIMENT YIELD RATING FACTOR
AND ESTIMATED SEDIMENT YIELD

GENERAL INSTRUCTIONS

District Office prepares one copy for District file.

SPECIFIC INSTRUCTIONS

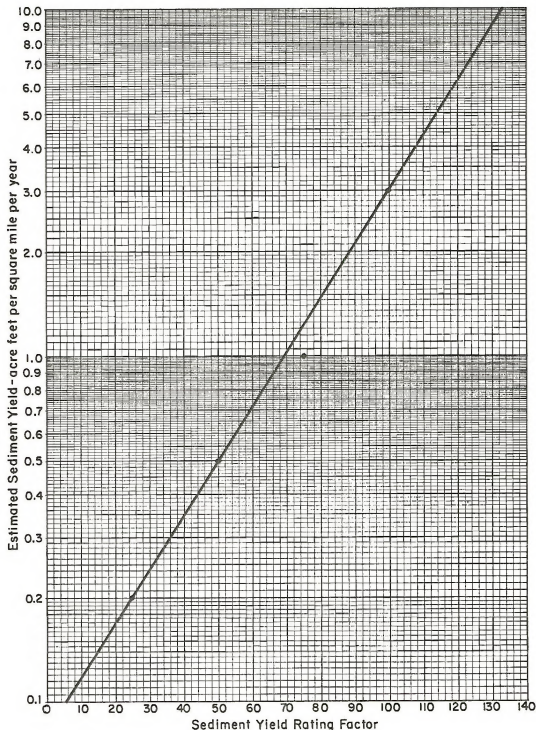
(Items not listed are self-explanatory)

Numbers indicate values assigned appropriate characteristics. Letters a, b, c, and d refer to independent

characteristics to which full value may be assigned.

Interpolation between the sediment yield levels may be made. High values for columns (a) through (g) should correspond to high values for (h) and (i). If they do not, factors (a) through (g) should be reevaluated. If they do not correspond, then a special erosion condition exists.

Convert *Total Rating* to sediment yield by use of graph.



APPENDIX E

TABLE E-5

PSIAC LAND USE FACTOR VALUES BY PERCENT POOR AND FAIR RANGE CONDITION

<u>Percent in Fair - Poor</u>	<u>Runoff Factor</u>
97 - 100	10
93 - 96	9
88 - 92	8
82 - 87	7
77 - 81	6
72 - 76	5
67 - 71	4
62 - 66	3
57 - 61	2
52 - 56	1
49 - 51	0
45 - 48	-1
39 - 44	-2
34 - 38	-3
30 - 33	-4
25 - 29	-5
21 - 24	-6
16 - 20	-7
9 - 15	-8
3 - 8	-9
0 - 2	-10

APPENDIX E

TABLE E6

CHANGE VALUES IN TOTAL EROSION FACTOR BY CHANGE IN RUNOFF,
GROUND COVER, AND LAND USE FACTORS

Difference in Sums (Present-Proposed Action)	Erosion Factor Change
-1 - 4	-1
5 - 9	-2
10 - 14	-3
15 - 19	-4
20 - 24	-5
25 - 29	-6
30 - 34	-7

APPENDIX F

WATER RESOURCES

F1 Summary of Standard Violations and Use Impairments

F2 Assumptions for Calculations for Runoff

**F3 Assumptions for Calculations of Suspended Sediment Delivered
to the Bighorn River**

TABLE F1

SUMMARY OF STANDARD VIOLATIONS AND USE IMPAIRMENTS

<u>Stream and/or Stream Segment</u>	<u>Problems</u>	<u>Standard Violation</u>	<u>Dates, Values & Locations of Stand Viol.</u>	<u>EPA Criteria Exceeded</u>	<u>Dates, Values Stream and/or Criteria Exceeded</u>	<u>Sources</u>
Greybull River below Bench Farmers Canal Diversion	Lack of flow causing impairment of fishery	No		No	May through September of most years	Irrigation diversions
Fifteenmile Creek	Sediment loading to Bighorn River causing fishery and aesthetic degradation	No		No	During any storm event	Natural & acceler- ated erosion of Willwood Formation
Gooseberry Creek and Tributaries below Hwy. 120	Salinity causing impairment to crop irrigation	No		Yes	Nov. 73 - Apr. 76 mean of 3,995 mg/l of TDS recorded at mouth	Natural erosion of saline shale beds
Enos Creek above Gooseberry Creek	Bacteria	Yes	July 9; 1,160 fecal coliform/100 ml. at mouth	Yes		Stock and wildlife grazing
Cottonwood Creek and Tributaries Cottonwood Creek Below Hamilton Dome	Salinity causing impairment to crop irrigation	No		Yes	Apr-June 1977 avg. 3,446 mg/l TDS at mouth	Discharge from Hamilton Oil Field & natural erosion of saline shale beds

TABLE F1

SUMMARY OF STANDARD VIOLATIONS AND USE IMPAIRMENTS
(Cont'd)

<u>Stream and/or Stream Segment</u>	<u>Problems</u>	<u>Standard Violation</u>	<u>Dates, Values & Locations of Stand Viol.</u>	<u>EPA Criteria Exceeded</u>	<u>Dates, Values Stream and/or Criteria Exceeded</u>	<u>Sources</u>
Grass Creek above Lower Grass Creek	Bacteria	Yes	June 1977; 1,400 fecal coliform/100 mls.	Yes		Stock & wild- life grazing
Owl Creek & Tributaries Owl Creek below Hwy. 120	Salinity causing detrimental effects on sensitive crops	No		Yes	Sept. 1976 1,500 mg/l TDS at mouth	Natural erosion of Cody, Mowry, and shales
Bighorn River* Chatham to Worland	Poor quality at Worland water intake due to the following: Sediment	No		Yes	Most of the time	Natural erosion from Fifteenmile, Nowater, and Kirby Creek
	Salinity	No		Yes	Most of the time	Hot Springs & treater dis- charges
	Bacteria	Yes	June, July, Sept., 1977	Yes	Most of the time	Drain ditches carrying sew- age & Thermop. sewage plant
	Nutrients	No		Yes	Most of the time	Natural erosion

TABLE F1
SUMMARY OF STANDARD VIOLATIONS AND USE IMPAIRMENTS
(Cont'd)

<u>Stream and/or Stream Segment</u>	<u>Problems</u>	<u>Standard Violation</u>	<u>Dates, Values & Locations of Stand Viol.</u>	<u>EPA Criteria Exceeded</u>	<u>Dates, Values Stream and/or Criteria Exceeded</u>	<u>Sources</u>
Bighorn River* Manderson to Basin	Poor quality at Basin water intake due to the following: Sediment	No		Yes		Natural erosion from Kirby Creek, Fifteenmile & irrigation return flows
	Salinity	No		Yes		Natural from Hot Springs & treater discharges.
Bighorn River	Bacteria	Yes	June 28, 1977	Yes		Drains carry sewage, live- stock grazing along streams
Coal Draw	Salinity loading to Bighorn	No		Yes	7,200 mg/l TDS recorded below oil field	Treater discharges and natural erosion
Red Canyon Creek	Turbidity and sedi- mentation of Bighorn River. Possible effects on fishery in Bighorn River	No		Yes	During any rain- storm	Natural erosion accelerated by over-grazing

*See Big Horn Basin 208 Water Quality Management Plan for further details.

APPENDIX F

APPENDIX F2

WATER RESOURCES

ASSUMPTIONS FOR CALCULATIONS FOR RUNOFF

Runoff quantities were derived by making some basic assumptions of recovery and enhancement of physical characteristics (i.e., infiltration and vegetative cover) on rangelands which are improving in condition from poor-fair to good-excellent. Studies have shown that areas with poor range condition produce more runoff than areas in good range condition. Most of this work has been done by comparing grazed watersheds with ungrazed watersheds.

Lusby (1970) found on desert salt shrub rangeland that after two years of such a comparison, runoff was 30 percent less in ungrazed watersheds when compared to grazed watersheds. Runoff was calculated for the Grass Creek EIS area by assuming that range sites in good-excellent condition would recover in hydrologic characteristics enough to reduce runoff by 20 percent from the areawide average of .16 inch/acre or to .13 inch/acre. Runoff from range which remains in poor-fair condition was assumed to produce runoff at 5 percent higher than the average or .17 inch/acre. Unclassified acres were assumed to remain at .16 inch/acre. Range class conditions were utilized from vegetation Table 3-1.

APPENDIX F3

WATER RESOURCES

ASSUMPTIONS FOR SUSPENDED SEDIMENT DELIVERED TO BIGHORN RIVER

Total delivery of sediment to the Bighorn River were calculated by taking sediment yield values in Soils, Table 3-6 and converting to tons by assum-

ing an acre foot of soil weighed 2,000 tons. Sediment delivery was then assumed to be 75 percent of this value.

The 75 percent figure was arrived at by reviewing data from the Fifteenmile drainage, which has received extensive watershed treatments and adjustments in forage use in the past. Reduction in suspended sediment in this drainage was 65 percent. Fifteenmile drainage received more extensive treatment than the EIS area will receive; therefore, 75 percent of the sediment yield is more representative of the entire EIS area.



APPENDIX G

WETLANDS

G1 Riparian Habitat Condition on Public Land in Grass Creek EIS Area

G2 Channel Habitat Trend on Public Land in Grass Creek EIS Area

APPENDIX G1

WETLANDS

WETLAND DATA METHODOLOGY

Data Sources and Evaluation Methods

Channel Stability

The channel stability rating (CSR) is based on a compilation of 15 estimates on the existing channel condition and its potential for resisting damage resulting from changes in the watershed (Pfankuch 1975). Measurements are segregated into those for upper banks, lower banks, and bottom.

The Forest Service developed the stability classification process to systemize evaluation measurements of mountain stream capabilities to retain bed and bank material and to recover from increased flow and sediment production from the watershed. In essence, the system provides an estimate of stream status under existing watershed conditions and stream capability to withstand changes at higher flows or increased sediment load. For BLM purposes, the resulting stability ratings are indicative of the impact of past land-use practices on the streams and their capability to withstand future modifications.

Past degradation of fishery habitat is not always made evident in the CSR. Presence of medium/large rubble in the banks and channels of high elevation streams generates high to fair CSRs regardless if the upper banks have receded due to past ungulate damage and erosion. This occurs due to the significant weight given to presence of highly stable rubble within the channel and lower banks and the lack of emphasis given to recession of upper banks. In the higher elevation areas of the EIS area, segments of streams which have been widened due to bank recession received fair CSRs due to presence of the solid rubble channels. These wide, shallow, reamed-out streams have lost most of their past fishery values but they are highly stable from the standpoint of being capable of handling large flows without further degradation of the bottom and lower banks.

Riparian Condition

Riparian condition was determined based on width of the riparian vegetative zone and the numerical rating for the "bank protection from vegetation" (density) parameter obtained in the channel

stability classification (Table G1). Width of riparian vegetation was rated as: 10 feet = 4, 10-19 feet = 3, 20-39 feet = 2, and 40 feet = 1. These width values were added to the vegetation density factors to determine totals which could be converted to ratings for riparian habitat condition. The point dispersion for the five habitat condition factors were: 4=Excellent, 5-7=Good, 8-10=Fair, 11-13=Poor, and 14-16=Virtually None. This evaluation procedure which was developed at the Rock Springs District, takes into consideration the plant density, vigor and diversity estimate (the CSR parameter) and riparian width (Smith 1979). It should be noted, however, that this evaluation was developed for rather small streams with normally narrow riparian corridors. When used on rivers such as the Bighorn or Greybull where riparian width is usually greater than 40 feet, ratings usually tend to be good even if bank conditions are somewhat degraded.

Habitat Trends

Habitat trend evaluations developed at Rock Springs are somewhat complex (Smith 1979). In essence, the CSR is used as an estimate of present habitat condition. The parameter values for upper bank protection from vegetation, mass wasting, and ungulate damage, and lower bank cutting are used to predict what will happen to the CSR (habitat condition) in the future. The end result is to classify all streams as either in stable or declining condition (Table G2). Although streams presently in "poor" condition (CSR > 114) are considered to be stable in this analyses, they can degrade more. Stream habitat in "good or fair" condition can significantly degrade if any of the previously listed stream condition parameters such as excessive cutting, mass wasting, or ungulate damage are accelerating stream degradation. Based largely on this line of reasoning, the following three categories for determining habitat trend were formulated by the Rock Springs District

Channel Stability > 114: Habitat Stable

Channel Stability 77-114: Habitat stable, unless: bank protection from vegetation > 8 (as rated on channel stability form); ungulate damage > 19 percent (also consider ungulate stability, if known); recently washed-out beaver ponds are present; cutting > 11 (from channel stability form); mass wasting > 8.

Channel Stability < 77: Habitat stable, unless: bank protection from vegetation > 8; ungulates damage > 9 percent; recently washed-out beaver ponds present; cutting > 8; mass wasting > 6.

APPENDIX G

APPENDIX G1

RIPARIAN HABITAT CONDITION ON PUBLIC LAND IN GRASS CREEK EIS AREA

		Excellent	Good	Fair	Poor	Virtually None
Owl Creek	Miles	--	1.90	6.20	12.55	.25
Drainage	Acres	--	11.07	24.75	26.93	.00
Cottonwood	Miles	--	1.30	.80	2.40	2.20
Creek	Acres	--	21.17	8.44	4.70	4.32
Drainage						
Gooseberry	Miles	.25	.75	1.45	1.70	.24
Creek	Acres	2.73	3.90	5.58	3.21	.71
Drainage						
Greybull	Miles	--	1.3	1.00	.85	--
River	Acres	--	32.8	20.48	17.35	--
Bighorn	Miles	--	3.30	1.55	--	--
River	Acres	--	33.31	24.03	--	--
Grass Creek	Miles	.25	8.55	11.00	17.50	2.69
EIS Area	Acres	2.73	102.25	83.28	52.51	5.03

APPENDIX G

APPENDIX G2 CHANNEL HABITAT TREND ON PUBLIC LAND IN GRASS CREEK EIS AREA

OWL CREEK DRAINAGE						
Channel Stability Rating	Good	%	High Fair	%	Low Fair	%
Miles Stable	0.0	0.0	1.55	14.0	0.0	0.0
Miles Declining	9.65	100.0	9.55	86.0	-15	100.0
Total	9.65		11.10		.15	
						20.90
						1.55
						7.4
						19.35
						92.6

COTTONWOOD CREEK DRAINAGE						
Channel Stability Rating	Good	%	High Fair	%	Low Fair	%
Miles Stable	0.0	0.0	.05	3.8	0.0	0.0
Miles Declining	.2	100.0	1.25	96.2	2.95	100.0
Total	.2		1.30		2.95	
						2.25
						6.7
						2.30
						34.3
						4.4
						65.7

GOOSEBERRY CREEK DRAINAGE						
Channel Stability Rating	Good	%	High Fair	%	Low Fair	%
Miles Stable	0.0	0.0	.25	35.7	0.0	0.0
Miles Declining	.25	100.0	.45	64.3	.65	100.0
Total	.25		.70		.65	
						2.79
						4.39
						3.04
						69.2
						1.35
						30.8

GREYBULL RIVER						
Channel Stability Rating	Good	%	High Fair	%	Low Fair	%
Miles Stable	0.0	0.0	0.0	0.0	.2	14.3
Miles Declining	.95	100.0	.8	100.0	1.2	85.7
Total	.95		.8		1.4	
						0.0
						3.15
						2.95
						93.7
						6.3

BIGHORN RIVER						
Channel Stability Rating	Good	%	High Fair	%	Low Fair	%
Miles Stable	.25	62.5	2.95	66.3	0.0	0.0
Miles Declining	.15	37.5	1.50	33.7	0.0	0.0
Total	.40		4.45		0.0	
						0.0
						4.85
						3.20
						66.0
						1.65
						34.0

GRASS CREEK EIS AREA						
Channel Stability Rating	Good	%	High Fair	%	Low Fair	%
Miles Stable	.25	2.18	4.8	26.16	.2	3.88
Miles Declining	11.20	97.82	13.55	73.84	4.95	96.12
Total	11.45		18.35		5.15	
						5.04
						0.0
						0.0
						29.70
						74.27
						39.99
						10.29
						25.73

APPENDIX H

WILDLIFE

H1 Comparison of Ecosystem Classification and Terminology

H2 Direction of Structural Development

H3 Criteria for Big Game Habitat Condition Classification

TABLE H1

COMPARISON OF ECOSYSTEM CLASSIFICATIONS AND TERMINOLOGY

Worland District Standard Wildlife Habitat Types ^{1/}	Range Sites from Grass Creek Soil Vegetation Inventory	Standard Range Types from Grass Creek URA	Vegetative Types Used in the EIS
3) Saltbush/Squirreltail/Birdfoot sage	*Shale 5-9", *Saline Upland 5-9" *Shale 10-14", *Saline Upland 10-14" Impervious Clay 5-9"	Saltbush	Saltbush Shrub
7) Alkali Sacaton/Basin Wildrye/Greasewood	*Saline Lowland 5-9", *Saline Lowland 10-14" *Saline Sub-irrigated 5-9" *Saline Sub-irrigated 10-14"	Greasewood	
1) Needleandthread/Wheatgrasses/Sagebrush (Basin)	*Sandy 5-9", *Shallow Sandy 5-9" *Loamy 5-9", *Shallow Loamy 5-9" Clayey 5-9", Shallow Clayey 5-9"	Sagebrush	Sagebrush
9) Bluebunch/Needlegrass/Shrub (Basin)	Gravelly 5-9", Very Shallow 5-9" Coarse Upland 5-9"		
2) Needleandthread/Prairie Sandreed	Sands 5-9"		
4) Bluebunch/Ricegrass/Sagebrush (Foothill)	*Sandy 10-14", *Shallow Sandy 10-14" *Loamy 10-14", *Shallow Loamy 10-14" *Clayey 10-14", *Shallow Clayey 10-14"		
4) Needlegrass/Fescue/Forb/Sagebrush	*Loamy 15-19", *Shallow Loamy 10-14" Clayey 15-19", Shallow Clayey 15-19" Sandy 15-19", Shallow Sandy 15-19"		
18) Bluegrass/Sedge/Forb	Subirrigated 20"+	Winterfat	
6) Sedge/Hairgrass/Willow	*Wetland 5-9", Wetland 10-14" Wetland 15-19", Sub-irrigated 15-19"	Meadow	Riparian
8) Basin Wildrye/Cottonwood	*Lowland 5-9", *Lowland 10-14", *Sub-irrigated 10-14", Clayey overflow 10-14" *Overflow 10-14", Overflow 15-19"	Broadleaf Tree	
20) Barren: Badlands Scree/Rubble/Rock Outcrop/Scarps	*Rock Outcrop 5-9" *Rock Outcrop 1014" (in part)	Waste, Barrens	Barren
10) Bluebunch/Sagebrush/Juniper	*Rock Outcrop 10-14", Coarse Upland 10-14" Very Shallow 10-14"	Junipers	Forest

TABLE HI
COMPARISON OF ECOSYSTEM CLASSIFICATIONS AND TERMINOLOGY
(Cont'd)

Worland District Standard Wildlife Habitat Types ^{1/}	Range Sites from Grass Creek Soil Vegetation Inventory	Standard Range Types from Grass Creek URA	Vegetative Types Used in the EIS
11) Needlegrass/Fescue/Sagebrush/Juniper	*Igneous 15-19", *Shallow Igneous 15-19" Coarse Upland 15-19" Very Shallow 15-19"		
12) Limber Pine			
14) Douglas Fir	*Forest 15-19" (in part)	Conifers	
15) Lodgepole Pine	Very Little in Grass Creek Area		
16) Aspen	*Woodland 15-19" (in part)		
17) Engelmann-spruce/Fir	*Forest 15-19" (in part)		
22) Artificial Seedings	Referred to appropriate range sites; stratified separately from non-seeded areas)	Croplands	Cropland
21) Burned Areas	Referred to Appropriate Range Sites)		
23) Urban/Industrial	*Disturbed		
24) Rivers and Streams	Riverbottom 5-9", 10-14", 15-19"	Wetlands	Wetlands (Not mapped in the EIS)
25) Lakes	*Reservoir, 5-9"		
26) Marshes/Potholes	Various Range Sites		

*Indicates that the Grass Creek Area has a significant acreage of the range site.

^{1/} Numbers correspond to the Worland District standard habitat types.

APPENDIX H

TABLE H2

DIRECTION OF STRUCTURAL DEVELOPMENT DUE TO PROPOSED MANAGEMENT ACTIONS

Discrete Management Action	Structural Layers				
	Grass/ Forb	Low Shrub	Tall Shrub	Tree	Tree/ Shrub
Livestock Grazing	<-->	<-->	<-->	-	<--
Controlled Burning	<--	<--	<--	<--	<--
Seeding and Planting	-->				
(a) Grasses	<--	<--	<--	<--	<--
(b) Grasses/Forbes	<-- -->	<--	<--	-	-
(c) Shrubs	-->	-	-	-	-
(d) Trees	-->	-->	-->	-	-
Brush Spraying	<-->	<--	<--	<--	<--
Rotary Beating	-->	<--	<--	-	-
Sod Ripping	-->	-->	-	-	-
Water Spreaders	-->	<-->	-->	-->	-->

--> Advances Structural Development (Change in Vertical Vegetation Layers
of the Plant Community)

<-- Retards Structural Development

<--> Advances or Retards Structural Development on Type or Level and
Intensity of Application

- No Effect on Succession

APPENDIX H

TABLE H3

CRITERIA FOR BIG GAME HABITAT CONDITION CLASSIFICATION

Bighorn Sheep, Elk

Good bighorn sheep and elk winter habitat in the Grass Creek Environmental Impact Statement Area is represented by climax perennial grass/shrub associations (bunch grass/sagebrush). Therefore, habitat condition was based on the ecological condition classification conducted in 1977. Future habitat condition projections are also based on inventory and ecological potentials from the 1977 survey.

Good ecological condition = good elk and bighorn winter habitat

Fair ecological condition = fair elk and bighorn winter habitat

Poor ecological condition = poor elk and bighorn winter habitat

Antelope and Mule Deer

For these species, we have very little quantitative data characterizing their habitats in the planning unit. Direct relationships cannot be drawn between ecological condition information and condition of their habitat.

Mule deer and antelope seasonal range conditions vary due to different stages of succession and are selected by season. Deer winter ranges are fair to poor due to lack of diversity of shrub species that are primarily sagebrush and rabbit brush. This applies to both mountain and desert habitats. Diversity of plant community types determines quality of summer ranges.

Sagebrush winter ranges are judged fair to poor due to single age structure, decadent stands due to old age and little diversity of shrub species. This applies to deer and antelope. Riparian shrub habitats are poor condition due to heavy use by livestock of deciduous shrub, low deciduous shrub vigor and reproduction.

Moose

Moose winter habitats are in fair condition in timber and uplands where deciduous shrub and tree production is not utilized by livestock to the extent of those near water sources. Those associated with water or reproduction, heavy utilization of existing plants, low vigor, and the lack of available forage in crucial seasons. Summer ranges vary in condition depending on livestock movements, but are fair to good in upland timber and poor where water resources are located.

APPENDIX I

WETLANDS

I1 Cattle Enterprise Budgets

I2 Sheep Enterprise Budgets

I3 Livestock Business Impacts, 1980 (Cattle)

I4 Livestock Business Impacts, 1980 (Sheep)

APPENDIX I

The data contained in Appendix I is based on an analysis conducted by the USDA Economics Statistics Service (ESS) for the Bureau of Land Management. The analysis concerns the economic impacts on ranch business of adjusting grazing. The ESS produces ranch budgets and measures the impacts of proposed forage changes on the budgets through a linear programming (1-p) analysis. A simplified description of the 1-p analysis is that each program run begins with a given number of cows, selects the cheapest forage that is available each month to feed the cows (private pasture, public land forage, purchased hay, etc.), adds the costs of supporting the cows for a year, and compares the total cost against the revenue gained from the sale of calves. If the revenue is positive, the program continues by adding cows and repeating the process. Whenever the total yearly costs exceed the sales revenue, that program run is rejected. The program tracks how much forage is used in each category every month and, when the maximum available level in a category is reached, only forage from other categories enters into the solution. For example, in May, the program may allow a maximum of 100 animal unit months (AUMs) of public

land forage, and 150 AUMs of private pasture to enter the solution, with any additional AUMs required coming from purchased hay. If a proposal is to eliminate grazing in May, the 100 AUMs of public land forage are deleted and the program is rerun to determine the solution that maximizes ranch income. The end product of the analysis is a set of program runs which maximizes the ranch income by balancing herd size with the least-cost feed source available under each proposed forage allocation change. Impacts are determined by comparing the initial solution with the solutions under the proposed changes.

Tables I1 and I2 display 1980 cattle and sheep budgets that are representative of those in the Big Horn Basin. The production assumptions, prices, and costs, are averages and will not fit one ranch exactly. However, they are based on data that were reviewed by livestock producers in the Grass Creek Resource Area and modified in response to the suggestions sent to the ESS.

Tables I3 and I4 display the anticipated impacts on the representative livestock business of adjustments in rangeland forage supplies.

APPENDIX I

TABLE II
CATTLE ENTERPRISE (0-199 Cows)

Item	Unit	Number	Average Weight	Price Cwt	Total Value
Sales:					
Steer calves	Head	21	410	71.23	6,133
Heifer calves	Head	8	380	62.82	1,910
Yearling steers	Head	11	730	59.02	4,739
Yearling heifers	Head	14	660	51.17	4,728
Cull cows	Head	13	1,015	36.99	4,881
Total					22,391
Total/cow					298.55
Cash costs:			Total Value	Value/ Cow	
BLM grazing fee			467	6.23	
Forest grazing fee			--	--	
Private range lease/rent			187	2.49	
State lease			32	.43	
Hay (produce)			3,373	44.97	
Hay (purchase)			1,670	22.27	
Protein supplement			1,040	13.86	
Irrigated pasture			--	--	
Salt and mineral			201	2.68	
Concentrate feeds			--	--	
Veterinary and medicine			525	7.00	
Hired trucking			239	3.19	
Marketing			345	4.60	
Fuel and lubricants			855	11.40	
Repairs			777	10.36	
Taxes			751	10.01	
Insurance			450	6.00	
Interest on operating capital			680	9.07	
General farm overhead			1,725	23.00	
Interest on Invest Capital borrowed			6,750	90.00	
Hired Labor			74	.98	
Total cash costs			20,141	268.55	
Other costs:					
Family labor			3,463	46.17	
Depreciation			2,927	39.02	
Interest on investment other than land			3,761	50.15	
Interest on land			15,695	209.26	
Total other costs			25,846	344.61	
Total all costs			45,987	613.16	
Return above cash costs			2,250	30.00	
Return above cash costs and family labor			-1,213	-16.17	
Return to total investment			-4,140	-55.20	
Return to land			-7,901	-105.35	

Production Assumptions - herd size 75 cows; 90% calf crop; 4% calf death loss to weaning; 23 cows per bull; 15% replacement rate; 3% cow loss; 245 AUMs from public lands.

APPENDIX I

TABLE II

CATTLE ENTERPRISE (200-899 Cows)
(Cont'd)

Item	Unit	Number	Average Weight	Price Cwt	Total Value
Sales:					
Steer calves	Head	105	410	71.23	30,665
Heifer calves	Head	53	380	62.82	12,652
Yearling steers	Head	45	730	59.02	19,388
Yearling heifers	Head	46	660	51.17	15,535
Cull cows	Head	42	965	36.99	14,992
Total					93,232
Total/cow					267.14
<hr/>					
Cash costs:			Total Value	Value/Cow	
BLM grazing fee			3,661	10.49	
Forest grazing fee			--	--	
Private range lease/rent			816	2.34	
State lease			148	.42	
Hay (produce)			12,275	35.17	
Hay (purchase)			6,095	17.46	
Protein supplement			4,869	13.95	
Irrigated pasture			--	--	
Salt and mineral			1,050	3.01	
Concentrate feeds			--	--	
Veterinary and medicine			2,443	7.00	
Hired trucking			1,396	4.00	
Marketing			789	2.26	
Fuel and lubricants			3,979	11.40	
Repairs			3,619	10.37	
Taxes			4,188	12.00	
Insurance			2,792	8.00	
Interest on operating capital			3,185	9.13	
General farm overhead			6,631	19.00	
Interest on Invest Capital borrowed			24,898	71.34	
Hired labor			4,795	13.74	
Total cash costs			87,629	251.09	
<hr/>					
Other costs:					
Family labor			9,304	26.66	
Depreciation			13,349	38.25	
Interest on investment other than land			21,132	60.55	
Interest on land			53,554	153.45	
Total other costs			97,339	278.91	
Total all costs			184,968	529.99	
Return above cash costs			5,603	16.05	
Return above cash costs and family labor			-3,701	-10.60	
Return to total investment			-17,050	-48.85	
Return to land			-38,182	-109.40	

Production Assumptions - herd size 349 cows; 90% calf crop; 4% calf death loss to weaning; 23 cows per bull; 18% replacement rate; 3% cow loss; 1936 AUMs from public lands.

APPENDIX I

TABLE II

CATTLE ENTERPRISE (900 & Over Cows)
(Cont'd)

Item	Unit	Number	Average Weight	Price Cwt	Total Value
Sales:					
Steer calves	Head	538	410	71.23	157,119
Heifer calves	Head	310	380	62.82	74,002
Yearling steers	Head	879	730	59.02	378,714
Yearling heifers	Head	445	660	51.17	150,286
Cull cows	Head	530	965	36.99	189,185
Total					949,306
Total/cow					286.28
Cash costs:			Total Value	Value/ Cow	
BLM grazing fee			20,924	6.31	
Forest grazing fee			8,655	2.61	
Private range lease/rent			8,509	2.57	
State lease			1,503	.45	
Hay (produce)			141,806	42.76	
Hay (purchase)			70,222	21.18	
Protein supplement			46,229	13.94	
Irrigated pasture			--	--	
Salt and mineral			9,053	2.73	
Concentrate feeds			--	--	
Veterinary and medicine			23,212	7.00	
Hired trucking			13,264	4.00	
Marketing			7,859	2.37	
Fuel and lubricants			36,476	11.00	
Repairs			33,558	10.12	
Taxes			33,160	10.00	
Insurance			29,844	9.00	
Interest on operating capital			33,714	10.17	
General farm overhead			56,372	17.00	
Interest on Invest Capital borrowed			203,204	61.28	
Hired labor			89,532	27.00	
Total cash costs			867,096	261.49	
Other costs:					
Family labor			47,750	14.40	
Depreciation			108,566	32.74	
Interest on investment other than land			193,323	58.30	
Interest on land			416,324	125.55	
Total other costs			765,963	230.99	
Total all costs			1,633,059	492.48	
Return above cash costs			82,210	24.79	
Return above cash costs and family labor			34,460	10.39	
Return to total investment			-74,106	-22.35	
Return to land			-267,429	-80.65	

Production Assumptions - herd size 3,316 cows; 90% calf crop; 5% calf death loss to weaning; 23 cows per bull; 20% replacement rate; 4% cow loss; 11072 AUMs from public lands.

APPENDIX I

TABLE I2

SHEEP ENTERPRISE (0-999 Sheep)

Item	Unit	Quantity	Average Weight	Price	Total Value
Sales:					
Slaughter Lambs	Head	98	102	59.81	5,979
Feeder Lambs	Head	230	87	66.47	13,301
Ewes	Head	37	100	17.48	647
Wool	Lbs.	345	10	.78	2,691
Wool Incentive pmt.	Dol.	2,691		.48	1,292
Unshorn Lamb paymt.	Cwt.	300		1.43	429
Total					24,339
Total/Ewe					72.65
Cash Costs:			Total Value	Value/Head	
BLM permit			306	.91	
Forest permit			--	--	
Private range lease/rent			984	2.94	
Hay (produce)			475	1.42	
Hay (purchase)			2,416	7.21	
Salt and minerals			82	.24	
Spray and dipping			20	.06	
Veterinary and medicine			209	.62	
Marketing			174	.52	
Trucking			188	.56	
Shearing and tagging			642	1.92	
Utilities			513	1.53	
Lamb promotion			59	.18	
Organizations			28	.08	
Legal and acct.			55	.16	
Wool storage			10	.03	
Predator control			296	.88	
Ram death loss			105	.31	
Fuel and lubricants			614	1.83	
Repairs			448	1.34	
Hired labor			444	1.33	
Taxes			676	2.02	
Insurance			253	.76	
General farm overhead			686	2.05	
Interest on investment capital			3,076	9.18	
Interest on operating capital			519	1.55	
Total Cash Costs			13,278	39.64	
Other Costs:					
Family labor			6,962	20.78	
Depreciation			1,824	5.44	
Interest on Investment other than land			2,411	7.20	
Interest on land investment			6,814	20.34	
Total Other Costs			18,011	53.76	
Total All Costs			31,289	93.40	
Return above cash costs			11,061	33.02	
Return above cash costs & family labor			4,099	12.24	
Return to total investment			2,275	6.79	
Return to land investment			-136	-.40	

Production Assumptions - herd size 335 ewes; 120% docking rate; 5% lamb loss docking to market; 16% replacement rate; 70% lambs sold as feeders; 5% ewe loss; 10 lbs. fleece weight, 32 ewes per ram; 162 AUMs from public lands.

APPENDIX I

TABLE I2

SHEEP ENTERPRISE (1,000 + Sheep)
(Cont'd)

Item	Unit	Quantity	Average Weight	Price	Total Value
Sales:					
Slaughter Lambs	Head	611	102	59.81	37,275
Feeder Lambs	Head	1,425	87	66.47	82,406
Ewes	Head	281	100	17.48	4,912
Wool	Lbs.	2,635	10	.78	20,553
Wool Incentive Pmt.	Dol.	20,553		.48	9,865
Unshorn Lamb Paymt.	Cwt.	1,863		1.43	2,664
Total					157,675
Total/Ewe					61.71
Cash Costs:					
			Total Value	Value/ Head	
BLM permit			5,672	2.22	
Forest permit			1,271	.50	
Private range lease/rent			5,839	2.29	
Hay (produce)			1,537	.60	
Hay (purchase)			6,984	2.73	
Salt and minerals			626	.25	
Spray and dipping			128	.05	
Veterinary and medicine			1,482	.58	
Marketing			537	.21	
Trucking			3,551	1.39	
Shearing and tagging			4,420	1.73	
Utilities			1,048	.41	
Lamb promotion			153	.06	
Organizations			281	.11	
Legal and acct.			741	.29	
Wool storage			409	.16	
Predator control			3,117	1.22	
Ram death loss			1,380	.54	
Fuel and lubricants			3,551	1.39	
Repairs			2,810	1.10	
Hired labor			11,881	4.65	
Taxes			2,401	.94	
Insurance			1,686	.66	
General farm overhead			2,734	1.07	
Interest on investment capital			14,187	5.55	
Interest on operating capital			3,443	1.35	
Total Cash Costs			81,869	32.04	
Other Costs:					
Family labor			10,041	3.93	
Depreciation			11,293	4.42	
Interest on Investment other than land			22,663	8.87	
Interest on land investment			25,563	10.01	
Total Other Costs			69,560	27.22	
Total All Costs			151,429	59.26	
Return above cash costs			75,806	29.66	
Return above cash costs and family labor			65,765	25.74	
Return to total investment			54,472	21.32	
Return to land investment			31,809	12.44	

Production Assumptions - herd size 2,555 ewes; 105% docking rate; 7% lamb loss docking to market; 18% replacement rate; 70% lambs sold as feeders; 7% ewe loss; 10 lbs. fleece weight; 32 ewes per ram; 3002 AUMs from public lands.

APPENDIX I

TABLE I3

LIVESTOCK BUSINESS IMPACTS 1980
(0-199 cows, average herd size 75)

Item	No Change	Percent Increases		
		10	20	30
		<u>Dollars</u>		
Gross Income	22,392	23,293	24,195	25,096
Total cash costs	20,131	20,684	21,237	21,790
Value of family labor	3,463	3,602	3,742	3,881
Depreciation	2,927	2,951	2,975	3,000
Interest on investment other than land	3,762	3,883	4,006	4,128
Return above:				
Cash costs	2,261	2,609	2,958	3,306
Cash costs and family labor	-1,202	-993	-784	-575
Return to total investment	-4,129	-3,944	-3,759	-3,575
Return to land	-7,891	-7,827	-7,765	-7,703
		<u>Head</u>		
Herd size	75.01	78.03	81.05	84.07

APPENDIX I

TABLE I3
LIVESTOCK BUSINESS IMPACTS, 1980
(0-199 cows, average herd size 75)
(Cont'd)

Item	Percent Reductions					
	10	20	30	40	50	100
	<u>Dollars</u>					
Gross Income	21,490	20,589	19,688	18,786	18,065	13,557
Total cash costs	19,578	19,025	18,472	17,919	17,500	15,664
Value of family labor	3,324	3,184	3,045	2,905	2,794	2,097
Depreciation	2,903	2,879	2,854	2,830	2,811	2,690
Interest on investment other than land	3,639	3,517	3,395	3,273	3,176	2,565
Return above:						
Cash costs	1,912	1,564	1,216	867	565	-2,107
Cash costs and family labor	-1,412	-1,620	-1,829	-2,038	-2,229	-4,204
Return to total investment	-4,315	-4,499	-4,683	-4,868	-5,040	-6,894
Return to land	-7,954	-8,016	-8,078	-8,141	-8,216	-9,459
	<u>Head</u>					
Herd Size	71.99	69.97	65.95	62.92	60.51	45.41

APPENDIX I

TABLE I3

LIVESTOCK BUSINESS IMPACTS, 1980
(200-899 cows, average herd size 349)
(Cont'd)

Item	No Change	Percent Increases		
		10	20	30
<u>Dollars</u>				
Gross income	93,214	98,106	102,998	108,078
Total cash costs	87,541	90,529	93,517	96,626
Value of family labor	9,302	9,790	10,279	10,786
Depreciation	13,348	13,482	13,616	13,754
Interest on investment other than land	21,129	21,900	22,671	23,471
Return above:				
Cash costs	5,673	7,577	9,481	11,452
Cash costs and family labor	-3,629	-2,213	-798	-666
Return to total investment	-16,977	-15,695	-14,414	-13,088
Return to land	-38,106	-37,595	-37,085	-36,559
<u>Head</u>				
Herd size	348.92	367.24	385.55	404.57

APPENDIX I

TABLE I3

LIVESTOCK BUSINESS IMPACTS, 1980
(200-899 cows, average herd size 349)
(Cont'd)

Item	Percent Reductions					
	10	20	30	40	50	100
	<u>Dollars</u>					
Gross income	88,321	83,429	78,349	73,457	68,564	43,883
Total cash costs	84,554	81,566	78,457	75,548	73,356	62,300
Value of family labor	8,814	8,326	7,819	7,331	6,842	4,379
Depreciation	13,214	13,081	12,942	12,808	12,675	12,000
Interest on investment other than land	20,358	19,587	18,786	18,015	17,244	13,355
Return above:						
Cash costs	3,767	1,863	-108	-2,091	-4,792	-18,417
Cash costs and family labor	-5,047	-6,463	-7,927	-9,422	-11,634	-22,796
Return to total investment	-18,261	-19,544	-20,869	-22,230	-24,309	-34,796
Return to land	-38,619	-39,131	-39,655	-40,245	-41,553	-48,151
	<u>Head</u>					
Herd size	330.61	312.30	293.28	274.97	256.65	164.27

APPENDIX I

TABLE I3
LIVESTOCK BUSINESS IMPACTS, 1980
Wyoming (900+ cows, average herd size 3,316)
(Cont'd)

Item	No Change	Percent Increases		
		10	20	30
<u>Dollars</u>				
Gross income	949,326	977,467	1,005,753	1,033,883
Total cash costs	866,829	884,732	902,732	920,614
Value of family labor	47,751	49,167	50,590	52,005
Depreciation	108,566	109,284	110,005	110,722
Interest on investment other than land	193,326	197,464	201,624	205,760
Return above:				
Cash costs	82,497	92,735	103,021	113,269
Cash costs and family labor	34,746	43,568	52,431	61,264
Return to total investment	-73,820	-65,716	-57,574	-49,458
Return to land	-267,146	-131,748	-259,198	-255,218
<u>Head</u>				
Herd size	3,316.01	3,414.37	3,513.18	3,611.43

APPENDIX I

TABLE I3
LIVESTOCK BUSINESS IMPACTS, 1980
(900+ cows, average herd size 3,316)
(Cont'd)

Item	Percent Reductions					
	10	20	30	40	50	100
	<u>Dollars</u>					
Gross income	918,490	887,431	856,595	825,535	794,699	640,073
Total cash costs	847,068	827,157	807,409	787,498	767,737	683,188
Value of family labor	46,200	44,638	43,087	41,525	39,974	32,196
Depreciation	107,780	106,988	106,202	105,410	104,623	100,680
Interest on investment other than land	188,791	184,223	179,689	175,121	170,586	147,847
Return above:						
Cash costs	71,422	60,274	49,186	38,037	26,962	-43,115
Cash costs and family labor	25,222	15,636	6,099	3,488	-13,012	-75,311
Return to total investment	-82,558	-91,352	-100,103	-108,898	-117,635	-175,991
Return to land	-271,349	-275,575	-279,792	-284,019	-288,221	-323,838
	<u>Head</u>					
Herd size	3,208.36	3,099.87	2,992.16	2,883.66	2,775.95	2,235.83

APPENDIX I

TABLE I4

LIVESTOCK BUSINESS IMPACTS, 1980
Wyoming (0-999 Sheep, average herd size 335)

Item	No Change	Percent Increases		
		10	20	30
<u>Dollars</u>				
Gross income	24,336	24,568	24,800	25,045
Total cash costs	13,244	13,178	13,112	13,040
Value of family labor	6,961	7,027	7,094	7,164
Depreciation	1,824	1,828	1,832	1,836
Interest on investment other than land	2,410	2,429	2,447	2,466
Return above:				
Cash costs	11,092	11,390	11,688	12,005
Cash costs and family labor	4,131	4,363	4,594	4,841
Return to total investment	2,307	2,535	2,762	3,005
Return to land	-103	106	315	539
<hr/>				
<u>Head</u>				
Herd size	334.99	338.18	341.36	344.74
<hr/>				
<u>Hours</u>				
Family labor	2,320	2,342	2,364	2,388
Hired labor	148	149	150	152

APPENDIX I

TABLE I4

LIVESTOCK BUSINESS IMPACTS, 1980
(0-999 Sheep, average herd size 335)
(Cont'd)

Item	Percent Reductions					
	10	20	30	40	50	100
<u>Dollars</u>						
Gross income	24,040	23,744	23,429	22,894	22,284	19,198
Total cash costs	13,277	13,310	13,344	13,250	13,116	12,438
Value of family labor	6,876	6,792	6,702	6,548	6,374	5,491
Depreciation	1,819	1,814	1,808	1,800	1,790	1,738
Interest on investment other than land	2,388	2,364	2,340	2,298	2,250	2,008
Return above:						
Cash costs	10,763	10,434	10,085	9,644	9,168	6,760
Cash costs and family labor	3,887	3,642	3,383	3,096	2,794	1,269
Return to total investment	2,068	1,828	1,575	1,296	1,004	-469
Return to land	-320	-536	-765	-1,002	-1,246	-2,477
<u>Head</u>						
Herd size	330.91	326.83	322.50	315.13	306.74	264.26
<u>Hours</u>						
Family labor	2,292	2,264	2,234	2,183	2,124	1,830
Hired labor	146	144	142	139	136	116

APPENDIX I

TABLE I4
LIVESTOCK BUSINESS IMPACTS, 1980
(1000+ Sheep, average herd size 2,555)
(Cont'd)

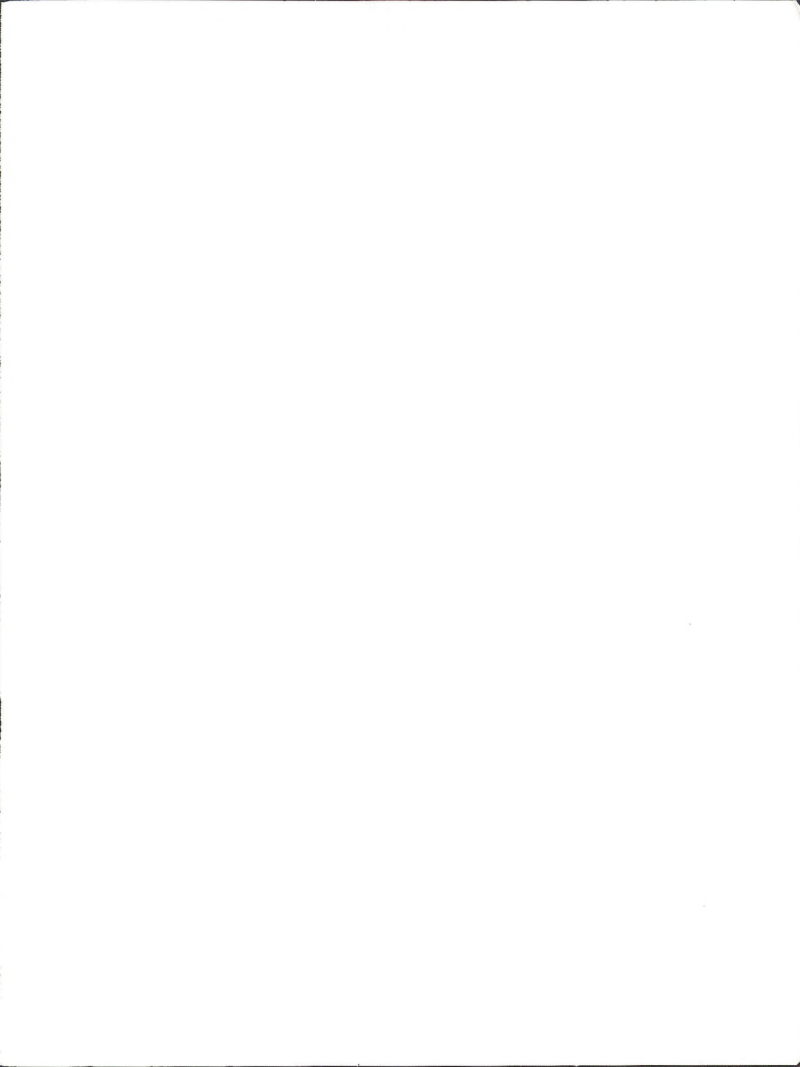
Item	No Change	Percent Increases		
		10	20	30
<u>Dollars</u>				
Gross income	157,681	161,386	165,081	168,776
Total cash costs	81,888	81,282	81,478	81,674
Value of family labor	10,042	10,278	10,513	10,748
Depreciation	11,293	11,372	11,450	11,528
Interest on investment other than land	22,664	23,125	23,585	24,045
Return above:				
Cash costs	75,793	80,104	83,603	87,102
Cash costs and family labor	65,751	69,826	73,090	76,354
Return to total investment	54,458	58,454	61,640	64,826
Return to land	31,794	35,329	38,055	40,781
<u>Head</u>				
Herd size	2,555.20	2,615.23	2,675.12	2,735.00
<u>Hours</u>				
Family labor	3,347	3,426	3,504	3,582
Hired labor	3,960	4,054	4,146	4,239

APPENDIX I

TABLE I4
LIVESTOCK BUSINESS IMPACTS, 1980
(1000+ Sheep, average herd size 2,555)
(Cont'd)

Item	Percent Reductions					
	10	20	30	40	50	100
<u>Dollars</u>						
Gross income	152,947	148,214	143,480	138,746	134,012	110,327
Total cash costs	82,265	82,642	83,018	83,394	83,771	85,655
Value of family labor	9,740	9,438	9,138	8,836	8,534	7,026
Depreciation	11,192	11,092	10,992	10,891	10,790	10,288
Interest on investment other than land	22,075	21,486	20,897	20,308	19,718	16,771
Return above:						
Cash costs	70,682	65,572	60,462	55,352	50,241	24,672
Cash costs and family labor	60,942	56,134	51,324	46,516	41,707	17,646
Return to total investment	49,750	45,042	40,332	35,625	30,917	7,358
Return to land	27,675	23,556	19,435	15,317	11,199	-9,413
<u>Head</u>						
Herd size	2,478.49	2,401.78	2,325.06	2,248.36	2,171.64	1,787.84
<u>Hours</u>						
Family labor	3,246	3,146	3,046	2,945	2,844	2,342
Hired labor	3,842	3,722	3,604	3,483	3,366	2,771







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